DEPARTMENT OF THE ARMY
BASE REALIGNMENT AND CLOSURE
ATLANTA FIELD OFFICE
BRAC ENVIRONMENTAL COORDINATOR
HAMILTON ARMY AIRFIELD
1 BURMA ROAD
NOVATO, CALIFORNIA 94949

August 11, 2004

DAIM-BO-A-HA

Subject: Forwarding the *Work Plan Remedial Action, Excavate Unlined Perimeter Drainage Ditch, Excavate South of the Runway DDT Hotspot, Demolish Revetments*, Hamilton Army Airfield, Novato, CA.

Ms. Naomi Feger
Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612

Dear Ms. Feger,

The Army is pleased to provide the *Work Plan Remedial Action, Excavate Unlined Perimeter Drainage Ditch, Excavate South of the Runway DDT Hotspot, Demolish Revetments*, Hamilton Army Airfield, Novato, CA.

A previous version of this document was erroneously submitted to you July 30, 2004. Please replace that submission with the enclosed replacement pages. The Storm Water Pollution Prevention Plan, which is Appendix A, was previously submitted under separate cover. Therefore this submission does not include Appendix A.

This document is submitted in accordance with Board Order No. R2-2003-0076 Site Cleanup Requirements (SCR) – Hamilton Army Airfield. This submittal satisfies SCR Task 2a for the Unlined Perimeter Drainage Ditch and Task 5b for the South of the Runway DDT hotspot.

This document is being submitted to the RWQCB in accordance with SCR provision C8. It is also being distributed in accordance with SCR provision C9 for information.

To support fieldwork this fall, I request your response by September 20, 2004. If you have any questions, please contact me at (415) 883-6386.

Sincerely,

Edward Keller, P.E.
BRAC Environmental Coordinator
Hamilton Army Airfield

Enclosure
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Distribution List
Work Plan Remedial Action Excavate Unlined Perimeter Drainage Ditch, Excavate South of the Runway DDT Hotspot, Demolish Revetments
Hamilton Army Airfield, Novato, CA

August 2004

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Hamilton Army Airfield, Novato, CA

August 2004

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WORK PLAN

Hamilton Army Airfield
Main Airfield Inboard Sites

Excavate Unlined Perimeter Drainage Ditch
Excavate South of the Runway DDT Hotspot
Demolish Revetments

REMEDIAL ACTION
FOR
HAMILTON ARMY AIRFIELD
NOVATO, CALIFORNIA

August, 2004

Prepared by:
SACRAMENTO USACE
Environmental Engineering Branch
1325 J Street
Sacramento, CA

U. S. Army Corps
of Engineers
Sacramento District

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USACE
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1325 J Street
Sacramento, CA

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BEC	BRAC Environmental Coordinator
BRAC	Base Realignment and Closure
CY	Cubic Yard
CSM	Coastal Salt Marsh
4,4'-DDD	4,4'-Dichlorodiphenyldichloroethane
4,4'-DDE	4,4'-Dichlorodiphenyldichloroethylene
4,4'-DDT	4,4'-Dichlorodiphenyltrichloroethane
DoD	Department of Defense
DQO	Data Quality Objectives
DTSC	Department of Toxic Substance Control
FADL	Field Activity Daily Log
FSP	Field Sampling Plan
GPS	Global Positioning System
HAAF	Hamilton Army Airfield
HDPE	High-Density Polyethylene
IT	IT Corporation
ODD	Outfall Drainage Ditch
PCB	Polychlorinated Biphenyls
PDD	Perimeter Drainage Ditch
PPE	Personal Protective Equipment
QAPP	Quality Assurance Project Plan
ROD/RAP	Record of Decision/Remedial Action Plan
RWQCB	San Francisco Regional Water Control Board
SAP	Sampling and Analysis Plan
SSHSP	Site Specific Health and Safety Plan
SOP	Standard Operating Procedure
SRW	South of the Runway DDT Hotspot
SVOC	Semi-volatile Organic Compound
SW3P	Storm Water Pollution Prevention Plan
UPDD	Unlined Perimeter Drainage Ditch
TPH	Total Petroleum Hydrocarbon
TSD	Total Dissolved Solids
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
VOC	Volatile Organic Compounds
WP	Work Plan

1.0 INTRODUCTION

Through previous sampling events at the South of the Runway DDT Hotspot and Unlined Perimeter Drainage Ditch sites within the main airfield inboard area at Hamilton Army Airfield (HAAF), locations of DDT contamination (with Total DDTs concentrations greater than 1 mg/kg) have been identified. In accordance with the Main Airfield Parcel Record of Decision/Remedial Action Plan (Army, DTSC, RWQCB 2003), soil on the former HAAF property that contains greater than 1 mg/kg Total DDTs must be excavated and disposed of off-site. The project will validate the removal of soil with known or suspected DDT concentrations in excess of 1 mg/kg at the two sites.

This work plan presents the project scope, regulatory authorities, project objectives, work, sampling procedures, and quality control requirements.

1.1 OBJECTIVE

The activities described herein will be performed to advance the environmental closure and Record of Decision/Remedial Action Plan (ROD/RAP) alternative provisions for residual pesticides following the transfer of HAAF. These activities are specific to environmental and ecological interests and are designed to achieve the objective of removing contamination levels that are above established cleanup goals. The concrete revetment pads are being removed to allow for future characterization sampling of the soil beneath them.

1.2 SCOPE OF WORK

This remedial action will be performed under a U.S. Army Corps of Engineers (USACE) contract. This Work Plan describes the construction-related activities required to meet the objective stated above for the Unlined Perimeter Drainage Ditch (UPDD), the South of the Runway DDT Hotspot (SRW) and the revetment pad sites at HAAF.

A site specific Storm Water Pollution Prevention Plan (SW3P) is required and is included as Appendix A. Appendix B is a Field Sampling Plan/Quality Assurance Project Plan (FSP/QAPP) describing the sampling and analytical procedures for the project. Site-specific activities are detailed in Section 2.0. Locations and details of the construction activities are shown on Figures 2-1 through 2-11. The schedule for construction is discussed in Section 4.2.

The primary scope covered by this work plan are summarized below:

Unlined Perimeter Drainage Ditch- Excavation and offsite disposal of soil containing DDT with levels above the cleanup goal of 1 mg/kg.

South of the Runway DDT Hotspot- Excavation and offsite disposal of soil containing DDT with levels above the cleanup goal of 1mg/kg.

Revetments – Demolish concrete revetment pads and dispose of concrete debris in the designated on-site location, figure 2-7.

The general scope of work for each site includes:

- Site mobilization and preparation including survey delineation of excavation horizontal and vertical boundaries, vegetation clearing, and utility location;
- Soil excavation and stockpiling (not applicable to revetment demo);
- Collection and analysis of confirmation samples during excavation activities (by Government);
- Off-site disposal of excavated soils;
- Relocation of concrete debris to a specified on-site disposal location (revetment sites only)
- Minor site restoration by smooth contour restoration

1.3 REGULATORY AUTHORITIES

The San Francisco Bay Area Regional Water Quality Control Board (RWQCB) shall administer primary regulatory oversight. The WP and final report for all activities shall be provided to the RWQCB for review and comment.

1.4 CHEMICALS OF CONCERN

The chemicals of concern for this sampling are Total DDTs. Soil with Total DDTs concentrations in excess of 1 mg/kg must be excavated and disposed of off-site.

1.5 DATA QUALITY OBJECTIVES

Preparation and documentation of project-specific data quality objectives (DQOs) is essential for assuring successful project execution. The DQOs are described in Section 2.0 of the FSP/QAPP.

1.6 BRIEF INSTALLATION HISTORY

Hamilton Army Airfield was constructed on reclaimed tidal wetlands by the U.S. Army Air Corps in 1932. The site, previously known as Marin Meadows, had been used as ranch and farm land since the Mexican Land Grant. Military operations began in December 1932, first as a base for bombers and, later, as a base for transport and fighter aircraft. The base played a major role in World War II as a training field and staging area for Pacific Theater operations. During the war, the base hospital served as an acute care and rehabilitation facility for thousands of war casualties each month. The base was renamed Hamilton Air Force Base in 1947 when it was transferred to the newly created U.S. Air Force. The U.S. Air Force ended military operations at Hamilton in 1976, and the property was declared surplus by the Department of Defense (DoD).

In 1976, the Army began using the runway and ancillary facilities and several other buildings for regular Army and Army Reserve operations. In 1984, the State of California claimed title to lands subject to tidal action, including portions directly adjacent to the levees that constitute the north and east boundaries of the BRAC property, North Antenna Field and the CSM.

In 1984, the remaining portions of the base were transferred to the Army and renamed Hamilton Army Airfield. The base was declared surplus property under the Base Closure and Realignment Act of 1988. Aircraft operations were discontinued in March 1994. In September 1994, the BRAC property was placed under the administrative management of U.S. Army I Corps at Fort Lewis, Washington (Army, 2001).

2.0 DESCRIPTION OF WORK

This section describes the planned approach for the removal actions for three sites, 1.Unlined Perimeter Drainage Ditch (UPDD) 2. South of the Runway DDT Hotspot (SRW) and 3. Revetment Pad area. All sites are located on the inboard airfield area at the former HAAF.

2.1 ECOLOGICAL PROTECTION PLAN

Minimization measures will be implemented to protect the local flora and fauna from the effects of the remedial actions.

Minimization measures include:

1) Limiting heavy equipment and truck travel to within the haul road and excavation site boundary;
2) Personal vehicle use restricted to the minimum required for travel to and from work areas.

The ecological protection plan and all construction activities will be accomplished subject to the guidelines set forth by USFWS (Section 7 consultation), California Department of Fish and Game (Incidental Take Permit), Regulatory Branch of the U.S. Army Corps of Engineers (Clean Water Act Section 404 Permits for Dredge and Fill Material, State Lands Commission Access Agreement Letter, California Coastal Commission, National Marine Fisheries Service, Regional Water Quality Control Board, and pertinent local regulations where applicable.

2.2 PRE-CONSTRUCTION ACTIVITIES

Pre-construction activities include obtaining required permits, mobilizing to the site, marking the planned excavation limits, establishing exclusion zones, inspecting for underground utilities, and clearing vegetation from the excavation area. The following sections describe the activities that will be performed in preparation for the excavation work.

2.2.1 Government Investigative Sampling

Sampling has been conducted by the USACE to define the extent, depth and geometry of the excavation necessary for each site in order to optimize the likelihood that all contaminated soil exceeding cleanup criteria will be removed.

2.2.2 Preparatory Meeting, Mobilization and Contractor Quality Control

A pre-construction meeting will be held between the USACE and the contractor. The meeting will address the scope of work, contract requirements, health and safety issues, and schedule.

Personnel, equipment, materials, and temporary facilities necessary to execute the project will be mobilized as needed to HAAF. Receipt and inspection of equipment and material will be documented on daily project logs. The contractor will have a quality control program to assure errors and deficiencies are minimal.

2.2.3 Permitting

Required state, federal and local permits will be obtained prior to the commencement of fieldwork. The Contractor will provide notification to the Bay Area Air Quality Management District (Regulation 8, Rule 40) that contaminated soil will be excavated. The local Department of Occupational Safety and Health will be notified at least two weeks prior to commencing excavation activities.

2.2.4 Utilities

No excavation will be performed until site identifiable utilities have been field located. A utility locator subcontractor will inspect for and identify locations of existing underground piping, utilities, or other types of metallic underground structures within and around the planned excavation areas. The utilities will be marked on the ground. Underground Services Alert will be notified at least 48 hours prior to the start of intrusive activities. Utilities encountered that were not previously shown or otherwise located will not be disturbed. Project personnel will perform a visual reconnaissance to locate and identify all utilities in the vicinity of the work areas.

2.2.5 Clearing

Clearing will be performed as needed at each of the specific work areas established to provide adequate work clearance while limiting impact to vegetation in proximity of the work areas. The clearing limits are to allow for access and generally agree with the proposed excavation boundaries for specific work areas (Figures 2-8 and 2-10).

2.2.6 Excavation Location Surveying

A licensed California land surveyor will establish a baseline and take profiles prior to, during, and after excavation of contaminated material. The surveyor is to certify that the final grade has been obtained by excavation and that the volume and location of contaminated material removed matches the required volume and location to be excavated as shown on figures 2-8 and 2-10. The survey crew will stake the field to delineate the exact depth required for the excavation.

2.2.7 Waste Management

Contaminated materials generated by work activities will be stored in Department of Transportation-approved 55-gallon drums. Drums will be placed on pallets underlain with a lined and bermed cell to contain any potential spills. The drums will be clearly labeled to indicate specific type of stored material, the date of its containerization, the project number and the project point of contact. Investigation-derived waste inventory forms will be prepared to track containers and the contents of each. Drums will be stored in a centrally located area on the site inboard of the levee to await disposal. Disposal of hazardous wastes will occur within 90 days of the date of generation.

Miscellaneous waste, such as polyethylene sheeting and general trash, will be stored in dumpsters or roll-off bins. This material will be disposed of as non-hazardous waste at an approved landfill or off-site recycling facility.

2.2.8 Site Specific Health and Safety

A Site Specific Health and Safety Plan (SSHSP) will be prepared. The SSHSP will be reviewed at the initial site safety orientation and by anyone that enters an exclusion zone. Work will be conducted in accordance with the SSHSP. The SSHSP contains an activity hazard analysis, personal protective equipment (PPE) requirements and emergency evacuation and reporting requirements.

2.2.9 Water Inflow Prevention

Inflow of water into excavations at each site will be controlled using the following measures:

- Field work has been planned based on time of year (sites are nearly dry during the summer months)
- Provisions will be made for temporary berms and pumps for water control. The storm water pump station will be operated as needed to reduce the amount of water in the ditch.

2.2.10 Temporary Facilities and Site Security

The HAAF BEC will approve equipment and material storage and staging areas. Decontamination and waste storage areas will be set up as described in Sections 2.3.6 and 2.3.7, respectively.

Site control requires the establishment of regulated areas and site security. Site controls will be established to protect the public from construction hazards (i.e., heavy equipment and open excavations). To maintain security during non-working hours, the contractor shall secure the site prior to leaving and all equipment and supplies stored in locked facilities.

Portable toilets and refuse containers will be set up near the work areas. Traffic control devices, such as barricades, cones, delineators, and signage, will be employed as necessary to manage pedestrian and vehicular traffic. Truck traffic between work areas will be set up as one-way looped haul roads.

2.2.11 Spill Response Materials

Appropriate spill response materials will be present to include containers, adsorbents, shovels, and personal protective equipment.

2.2.12 Pre-Excavation Survey and Marking Planned Excavation Limits

A licensed California land surveyor will develop the layout and mark planned excavation limits prior to the mobilization of the construction crew and equipment. The area of excavation will be field-located using appropriate surveying techniques. Excavation limits for each of the sites are shown on Figures 2-1 and 2-2 and again in more detail on 2-8 and 2-10.

2.3 EXCAVATION ACTIVITIES

The following sections describe the excavation and restoration of the two Main Airfield sites described in this work plan.

2.3.1 Excavation

Prior to excavation, the ground surface at the location of each planned excavation site will be cleared of vegetation, asphalt, and concrete. Steps will be taken to ensure that vegetation clearance is held to the minimum needed for the job. Excavation areas, volumes and depths are shown on Figures 2-8 and 2-10. Excavation areas will be clearly staked and will not be over-excavated. The grading plan is shown on the excavation maps. See figures 2-8 and 2-10. Each plot is color coded to indicate depth of excavation within each plot.

The soil will be excavated in as little as one-half foot cuts using appropriate equipment for the proper control of accuracy and efficiency such as an excavator, scraper, backhoe and/or front-end loader based on the size and configuration of the excavation. Excavated soil will be stockpiled at locations as indicated in Figure 2-4 and 2-5. Further details on temporary stockpiling and subsequent off-site disposal of contaminated soil are described in Section 2.4.

Prompt notification of all interested parties will occur and proper steps will be taken before further excavation at the particular location should contaminated material be discovered that has not been previously identified or if other discrepancies between data provided and actual field conditions are discovered.

Excavation will be performed in a controlled manner that will limit potential for spills and the potential for contaminated material to be mixed with uncontaminated material. Safety tape and warning signs shall be posted and maintained in accordance with Occupational Safety and Health Administration regulations.

The total estimated area and volume of the excavations for each site is as follows:

Table 2-1: Estimated Area, Volume, and Depth of Excavations

Site	Planned Excavation*			Ingress and Egress Area (ft^2)
	Estimated Area (ft^2)	Estimated Volume (CY)	Depth (ft)	
UPDD DDT[Figure 2-8]	10,800	700	0.5 to 2	15,000
SRW DDT Hotspot [Figure 2-11]	151,900	5,605	1 to 4	0
TOTAL		**6,305**	**NA**	**15,000**

*Amounts are estimated and actual amounts may vary due to field conditions and final confirmation samples clearance.

In no case will critical structures be disturbed during excavation. Critical structures may include levees, roads, drainage ditches, pipelines, some buried utilities, and poles for overhead power and telephone lines. Personnel and equipment will not enter the excavation without prior approval of the Site Safety and Health Officer.

If necessary, soil and bunker rock may be taken from on-site locations such as existing stockpile C4D5 to use as temporary ramps for vehicles. A government representative will specify such locations in the field.

2.3.2 Dewatering

Prior to the beginning of the excavation at the UPDD, the ditch will be pumped down by using the storm water pump station to reduce the amount of water in the ditch. The elevation of the water in the ditch will be maintained at a lower level during this excavation to minimize the need for dewatering the excavation site. Dewatering may still be required at the UPDD bank side and bottom. Standing water in the ditch bottom may be pumped down stream to minimize handling and adding saturated soil to the UPDD stockpile. Dewatering will be limited to that necessary to assure adequate access, a safe excavation and the prevention of the spread of contamination.

2.3.3 Disposition of Utilities and Structures

If utilities or structures other than those discussed in this plan are encountered during excavation work, the HAAF BEC will be consulted to determine if the utility is currently in service or if future use is planned. In general, if a utility is in service or planned for service, it will be braced and protected or relocated during excavation and backfilling activities. If a utility is out of service, it may be removed, or abandoned, at the discretion of the USACE and HAAF BEC

2.3.4 Sidewall Sloping

Gradual sidewall sloping of excavations greater than one foot to minimize abrupt drops (i.e. safety hazards) and sloughing will be employed after the excavation has been validated by the survey.

2.3.5 Soil Confirmation Samples

A USACE representative will be present to inspect removal of contaminated material from each site. Once the excavation depth has been reached, samples will be collected as described in the FSP, Appendix B. One half of each sample will be analyzed using field test kits. If that sample contains Total DDTs greater than 1mg/kg excavation will continue. If the sample results are less than 1mg/kg, it will be sent to a certified lab for verification. The locations of these samples will be recorded using GPS equipment and will be included in the summary report.

2.3.6 Generated Waste

Liquid generated from decontamination procedures will be temporarily stored in watertight containers such as 55-gallon barrels or holding tanks. Containers will be clearly labeled to indicate specific source, type of material, date of containerization, project contact, telephone number, and project number. Disposal will occur within 90 days of the date that the liquid is containerized.

Non-hazardous miscellaneous waste, such as construction debris, polyethylene sheeting, general trash, asphalt, and concrete, will be stored in dumpsters or roll-off bins and removed from the site.

Air emissions will be monitored and controlled.

2.3.7 Decontamination After Remedial Action

A decontamination area for heavy equipment will be set up. The decontamination area will include a polypropylene lined, bermed cell with a sump for water collection and holding tank. A water source (or water truck) and water-collection tank will be located near each decontamination area.

Heavy equipment, including backhoes, excavators, and front-end loaders, will be decontaminated prior to moving to a different site and/or exclusion zone. The tires, or tracks, of equipment that have traveled on contaminated soil will be cleaned by dry methods using pry bars, shovels and brooms before the equipment leaves each site.

A small decontamination area will be set up prior to the start of any sampling event. This area will be situated upwind of dirt work activity to reduce danger of recontamination. Reusable sampling equipment that will come in direct contact with soil, including trowels and bowls, will be thoroughly decontaminated. Personnel decontamination areas will be established at work areas as required in the SSHSP.

Wastes collected during decontamination activities will be disposed as described in Section 2.3.6. At the end of each workday, wastes from decontamination activities will be stored in the designated storage areas until final disposal.

2.3.8 Post-Excavation Survey

A licensed California land surveyor will prepare a survey of the limits of each excavation. Survey data will be documented in the summary report.

2.3.9 Sampling of Stored Material

Analyses for contaminated material to be taken to an approved receiving facility will conform to local, state, and federal criteria as well as to the requirements of the facility.

2.3.10 Site Restoration

The excavated areas will be handled as follows:

- After the post-excavation survey the sidewalls for the UPDD and the SRW DDT Hotspot will be knocked down and gradually sloped to match the general contours of the surrounding area.
- No concrete, asphalt, aggregate base or fencing work will be performed;
- Power pole replacement or relocation will not be performed. Inactive power poles that interfere with the concrete demolition/soil removal will be removed and disposed of;
- As-built documentation of excavations will be based on the survey to be performed by a licensed surveyor and a complete set of survey data will be provided as part of the documentation in the summary report; and
- Underground utility repairs in the scope and will not be performed without authorization.

When field activities are completed, the decontamination areas will be removed, and the area will be restored as much as possible to the original conditions.

Unlined Perimeter Drainage Ditch- – The excavation will be graded to the general contours of the surrounding area allowing rainwater to drain in the same fashion it did before disturbing the site.

South of the Runway DDT Hotspot - The excavation will be graded to the general contours of the surrounding area allowing rainwater to drain in the same fashion it did before disturbing the site.

2.3.11 Spills

In the event of a spill or release of a hazardous substance, pollutant, contaminant, or oil the Contractor will notify the BEC and USACE immediately. If the spill exceeds the reporting threshold, the Contractor will follow the pre-established procedures as described in the SSHSP

for immediate reporting and containment. Immediate containment actions will be taken to minimize the effect of any spill or leak. Cleanup will be in accordance with applicable federal, state, and local regulations.

2.4 STOCKPILING AND DISPOSAL

Upon excavation, contaminated soil will be moved to an on-site location and stockpiled while awaiting disposal waste profile test results. When results are available a decision will be made as to the proper disposal landfill. Work by the contractor in this project will adhere to the haul routes depicted in Figure 2-3 unless mutually agreed upon alternates are required in order to coordinate traffic flow with other ongoing activities that may be underway by other contractors.

2.4.1 Stockpiling

Stockpiles will be constructed to isolate stored contaminated material from the environment. The maximum stockpile size will be approximately four feet in height and in the locations depicted in Figures 2-4 and 2-5. Stockpiles will be constructed to include:

- **a.** A chemically resistant geomembrane liner free of holes and other damage. Non-reinforced geomembrane liners will have a minimum thickness of 0.25 mm. The ground surface on which the geomembrane is to be placed will be free of rocks greater than 0.5 inches in diameter and any other object, which could damage the membrane.
- **b.** Geomembrane cover free of holes or other damage to prevent precipitation from entering the stockpile. Non-reinforced geomembrane covers will have a minimum thickness of 0.25 mm. Scrim reinforced geomembrane covers will have a minimum weight of 26 lbs. per 1000 square feet. The cover material will be extended over the berms and anchored or ballasted to prevent it from being removed or damaged by wind.
- **c.** Berms surrounding the stockpile will be a minimum of 12 inches in height. Vehicle access points will also have berm material available nearby for use if required. Incorporation of existing berms will be permitted.
- **d.** The liner system will be built to contain leachate. Storage and removal of leachate which collects in the stockpile liner will be managed in accordance with the paragraph regarding Liquid Storage

2.4.2 Disposal

Offsite disposal of all contaminated material will be in accordance with all pertinent regulations.

2.4.2.1 Soil

After stockpiling, soil will be transported to and disposed of at an off-site facility permitted to receive the material. Soil will be analyzed for the parameters and by the methods required by the disposal facility. Copies of analytical test results will be provided to the disposal facility as required to obtain disposal permission. Analytical data from waste profile samples will be provided to the USACE for review prior to completion of waste profiling and removal of the soil from the site. Bulk carriers will transport the soil off-site to the licensed disposal facility. The

carriers will be owned and operated by a transporter that is licensed and permitted to transport the waste. Any hazardous waste soil will be transported under a uniform hazardous waste manifest.

2.4.2.2 Liquids

Liquid wastes generated during the soil removal activities may include decontamination rinsate water. These liquids will be collected and stored in drums or portable tanks and transferred directly to a vacuum truck or trailer for transport to a disposal facility, or discharged in accordance with regulatory requirements.

Samples will be collected, as required by the proposed disposal facility, and the water will be characterized for disposal. Previously obtained analytical results will be used to the extent possible in characterizing the wastes. Once permission has been received from the disposal facility and the generator, the water will be transported off-site for treatment/disposal. Any hazardous waste liquid will be transported under a uniform hazardous waste manifest.

2.4.2.3 Debris and Miscellaneous Waste

Debris consisting of non-hazardous combustible and non-combustible wastes resulting from demolition and clearing and grubbing waste will be disposed of off-site according to applicable Federal, State, and local requirements.

Miscellaneous waste such as construction debris, polyethylene sheeting, and general trash, will be disposed of as non-hazardous waste at a generator-approved landfill or an off-site recycling facility.

2.5 REVETMENT DEMOLITION

2.5.1 Revetments

A revetment is defined as a circular concrete pad formerly used for parking military aircraft. There are six revetments to be demolished at HAAF under this work plan. Approximate thickness is listed in Table 2-2 and their locations shown in Figure 2-6. The revetments are approximately 98 feet in diameter and vary in thickness (Table 2-2). History and current evidence suggest that the concrete that make up these revetments is not reinforced (no rebar.

Table 2-2: Revetments to be Demolished

Revetment Number	**14**	**19**	**21**	**22**	**25**	**26**
Thickness (inches)	**14**	**10**	**18**	**11**	**15**	**8**

2.5.2 Utilities Clearance

A check will be made for the existence of any utilities associated with the revetments. If any utilities are located, they will be brought to the attention of the Government field representative.

2.5.3 Revetment Demolition and Monitoring

The contractor will break up the revetments and remove all concrete and steel debris from the revetment area. The concrete will be hauled to the on-site location designated in Figure 2-7 where it will be leveled to not exceed +4 foot above existing grade. The intent is to have a site completely cleared of concrete debris, however some residual concrete particles less than 4-inch diameter may remain.

Some of the soil under and surrounding the revetments is contaminated with low levels of one or more of the following: total petroleum hydrocarbons (TPH), TPH-diesel (TPH-d), TPH-gasoline (TPH-g), polynuclear aromatic hydrocarbons (PAHs), DDT, or metals. The routes of chemical exposure that can be anticipated are inhalation, direct skin contact and incidental ingestion of contaminated materials. It is anticipated that the revetment demolition can be accomplished in Level D PPE. The Contractor will prepare and implement an exposure monitoring/air sampling program to identify and quantify airborne levels of the listed chemicals to assure proper selection of engineering controls, work practices and personal protective equipment. The Contractor will monitor with a PID. Action levels will be established based on the Cal-OSHA permissible exposure limits (PELs) and ACGIH threshold limit values (TLVs). The contractor will avoid potential exposure by minimizing disturbance to the soil under and near the revetments.

There will be an Accident Prevention Plan/Hazard, schedule, complete with a list of subcontractors and responsible persons to support concrete demolition activity. During the revetment portion of the project, if conditions are not as anticipated/described (PID/FID readings exceed action levels, visible free-standing petroleum product, etc.) work will cease and Government representative notified.

There is no size limitation for on-site disposal except the concrete debris will not be piled more than 4 feet above the ground surface and must be within the boundaries as shown in Figure 2-7. The contractor will minimize void spaces during concrete placement within the boundaries. The contractor will remove any excessive soil that is attached to the concrete debris as is practical and leave this soil in place within the former revetment area. It is not necessary to remove the adjacent asphalt/concrete that connects to the circular revetments. Only the circular 98-foot diameter concrete revetments will be demolished and removed from the area. The contractor will minimize soil migration to other areas and brush and sweep all soil off equipment at each revetment to prevent possible cross contamination.

This work requires a Storm Water Pollution Prevention Plan (SW3P) under a NPDES storm water permit since the total area of the haul road and revetments exceeds 1 acre. The Army BRAC Office has submitted a NPDES NOI to the SWRCB to cover this activity. The Appendix A SW3P to this WP addresses the revetment demo activity and the BRAC remedial action sites. An approved SW3P is required prior to commencement of the demolition of the revetments.

The minimum storm water Best Management Practices (BMP) are as follows: The contractor will install a straw wattles on the downstream side of the revetment and on the off-pavement dirt surfaced haul road. Generally, runoff water flows toward the Perimeter Drainage Ditch (PDD).

The government will submit a Notice of Termination and the Annual Compliance Reports to the RWQCB.

2.6 DUST CONTROL

Dust control will be implemented as needed during the field activities associated with the project. If needed, dust control during surface soil excavation will be achieved through application of water. The source of water will be the hydrant on the northwest side of Building 82. Excavation areas subject to dust control will be treated with water dispensed from a water truck or trailer or by water sprayed from pressurized hose. The dust control is to minimize saturation, and to mitigate negative impacts to human health, and the environment. Water will be fogged or sprayed into the dust around the waste and waste surface in minimal volumes to provide dust suppression only.

2.7 DEMOBILIZATION

Demobilization will consist of the removal of heavy equipment, tools, and supplies; and evacuation of the temporary office space. Temporary fence, traffic control devices, tape, signs, storage containers, and refuse containers will be removed from the site. Debris will be properly disposed off-site and work areas will be cleaned and left in condition similar to their condition before commencement of the project activities. A post-construction site walk will be conducted before demobilization is complete. Representatives of USACE will attend this site walk. The purpose of this final site walk is to verify that areas are in satisfactory condition following work completion.

2.8 PHOTO DOCUMENTATION

Photographs will be taken to document the work activities at each site. A photo log will be part of the summary report.

3.0 POST CONSTRUCTION DOCUMENTATION

A summary report that documents work performed will be prepared. The report will include the following information as a minimum:

a. A cover letter signed by a responsible company official certifying that all services involved have been performed in accordance with the terms and conditions of the contract documents and regulatory requirements.

b. A narrative report including, but not limited to, the following:

(1) site conditions, ground water elevation, and cleanup criteria;

(2) excavation logs;

(3) field screening readings;

(4) quantity of materials removed from each area of contamination;

(5) quantity of water/product removed during dewatering;

(6) sampling locations and sampling methods;

(7) sample collection data such as time of collection and method of preservation;

(8) sample chain-of-custody forms; and

(9) source of ramp material.

c. Copies of all chemical and physical test results.

d. Copies of all manifests and land disposal restriction notifications.

e. Copies of all certifications of final disposal signed by the responsible disposal facility official.

f. Waste profile sheets.

g. Daily Logs

Scale drawings will be included in the summary report that depict limits of each excavation, limits of contamination, known underground utilities within 50 feet of excavation, sample locations, and sample identification numbers. On-site stockpile, storage, treatment, loading, and disposal areas will also be shown on the drawings.

h. Progress Photographs. Color photographs will be used to document progress of the work.

4.0 PROJECT MANAGEMENT AND ORGANIZATION

4.1 PROJECT ORGANIZATION

4.1.1 Project Manager

Mr. Raymond Zimny is the Sacramento District Project Manager (PM). The PM is responsible for the overall organization and management of the work both in-house and contract action. The PM oversees the administration, resource management and coordination among client, contractor, staff and the USACE project delivery team (PDT). Mr. Zimny can be reached at 916/557-6965 or by email at Raymond.E.Zimny@usace.army.mil .

4.1.2 Team Member – Technical Lead

Mr. James Lukasko is the Sacramento District Project Development Environmental Engineer on the PDT. Serves as the technical team leader and is responsible for

development of quality products and is the point of contact for the technical discipline pool. Assists the PM in the development in the scope of service, task duration, cost and resource estimates and commitments.

4.1.3 Team Chemist

Ms. Kathleen Siebenmann is the Sacramento District Project Development Chemist on the PDT. Provide discipline specific task requirements and participate in the development in the scope of service, task duration, cost and resource estimates and commitments. She is responsible for instruction of field personnel, contamination investigation quality control and the timeliness of chemistry contributions to the project delivery effort.

4.1.4 Database Manager – Chemistry Quality Control Manager (CQCM)

Mr. Carleton Fong is the Sacramento District Project Development Database manager on the PDT. He is responsible for the database management for project-related environmental data. He maintains the environmental database that includes sample location coordinates, sample information, and laboratory analysis results. Database Manager will work with the Project Chemist to ensure that all data are collected and reported correctly.

4.1.5 Contract Laboratory

Labs report to the Project Chemist or the CQCM and are responsible for implementing their quality management plan and providing analytical and related services in accordance with the approved QAPP, project work plan, and referenced procedures.

4.1.6 Program Safety and Health Officer

Ms. Donna Maxey is the Sacramento District Project Development Safety and Health Officer. She is responsible for developing and coordinating the in-house health and safety plans as well as reviewing contractor plans for accuracy.

4.1.7 Field Sample Custodian

The field sample custodian reports to the appropriate task manager and is responsible for ensuring the custody of collected samples and associated documentation from collection to receipt by the lab.

4.1.8 Contractor Quality Control System Manager

Mr. Thomas Purbough is the Cerrudo Services PM and as such is responsible for the quality control (QC) for all Contractor related project activities.

4.1.9 BRAC Environmental Coordinator

Mr. Ed Keller is the BRAC Environmental Coordinator and as such is responsible for ensuring BRAC compliance for all Contractor related project activities.

4.2 PROJECT SCHEDULE

A detailed project schedule will be prepared by the contractor and will be updated on a weekly basis.

It is anticipated that revetment removal and DDT excavation activities will occur at the UPDD from September 2004 through November 2004. Due to funding constraints the DDT hotspot excavation south of the runway is an optional task in this project. It is an option that may be exercised as soon as funding is obtained. Therefore, fieldwork on the SW DDT hotspot most likely will not occur until the spring of 2005 after the site is dried out from the winter rains.

5.0 REFERENCES

Army (U.S. Department of the Army), DTSC (California State Department of Toxic Substances Control), RWQCB (California Regional Water Quality Control Board) 2003. *Main Airfield Parcel Record of Decision/Remedial Action Plan, Hamilton Army Airfield*, Public Comment Final, August 2003.

IT Corporation, 1999. *Comprehensive Remedial Investigation Report, BRAC Property, Hamilton Army Airfield,* April 1999.

Foster Wheeler Environmental Corporation, 2000. *Remedial Design Investigation Final Data Report, BRAC Property, Hamilton Army Airfield,* February 2000.

USACE, 2004. *Combined Final Report on Results of the Area-Wide DDT Site Investigation, Hamilton Army Airfield,* March 2004.

USACE 2004. *Work Plan, Miscellaneous Site Investigations, Hamilton Army Airfield*, Final, January 2004.

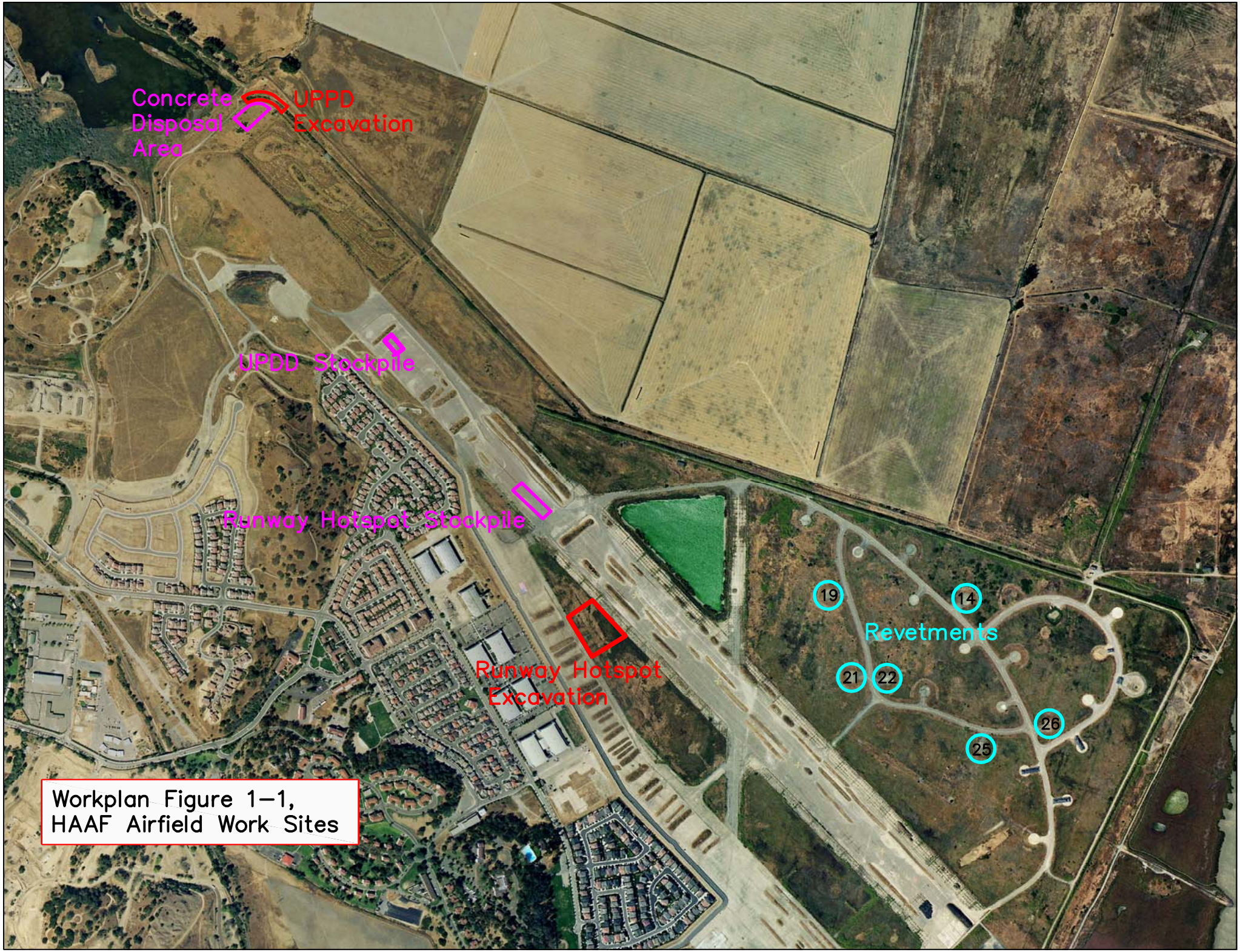
U.S. Environmental Protection Agency (EPA) 1996. *Test Methods for Evaluating Solid Waste Physical/Chemical Methods, Third Edition*, December 1996.

U.S. Fish and Wildlife Service Biological Opinion and Amending Letter, August 2004 and September 2003.

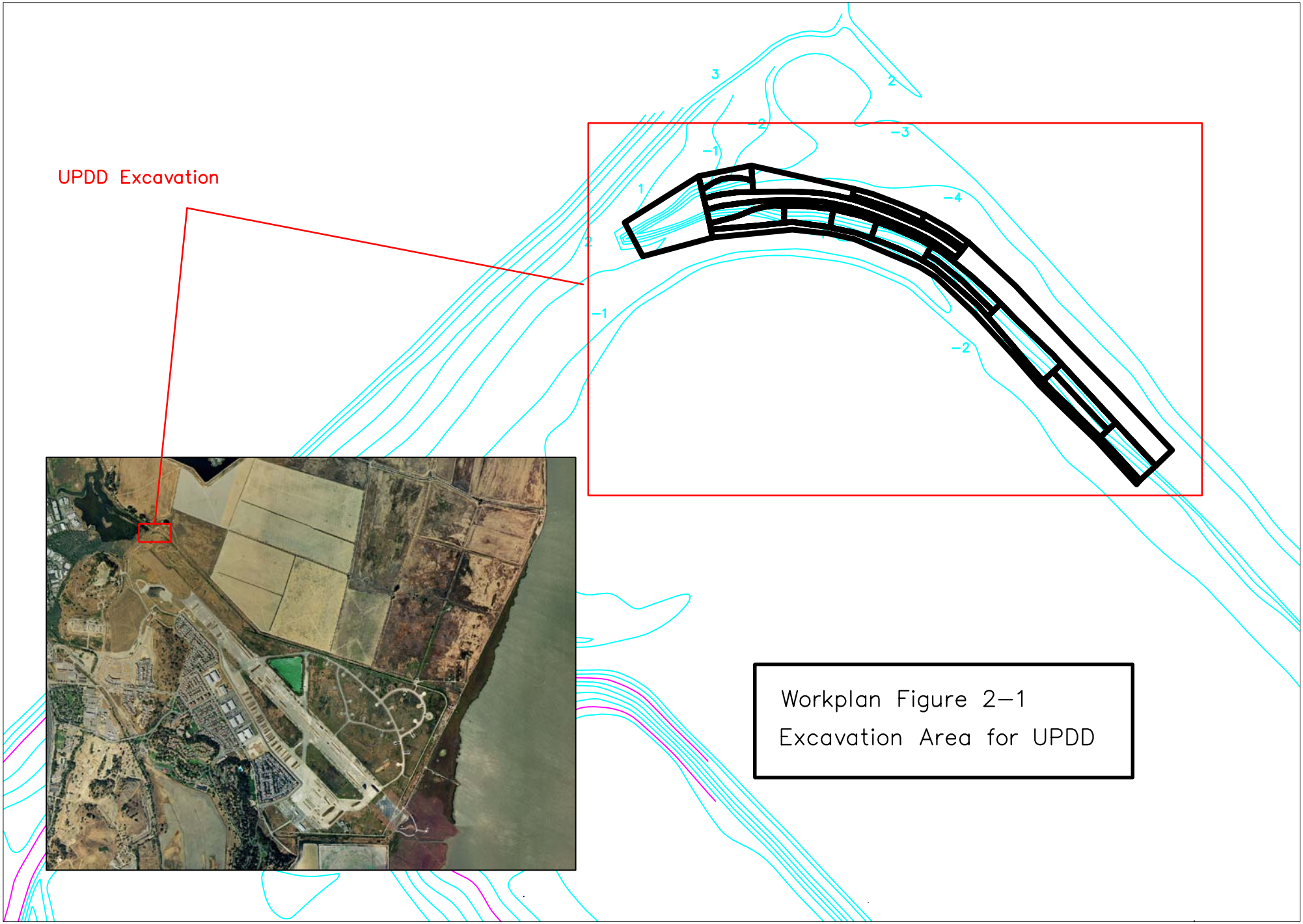
6.0 APPENDICES

APPENDIX A STORM WATER POLLUTION PREVENTION PLAN

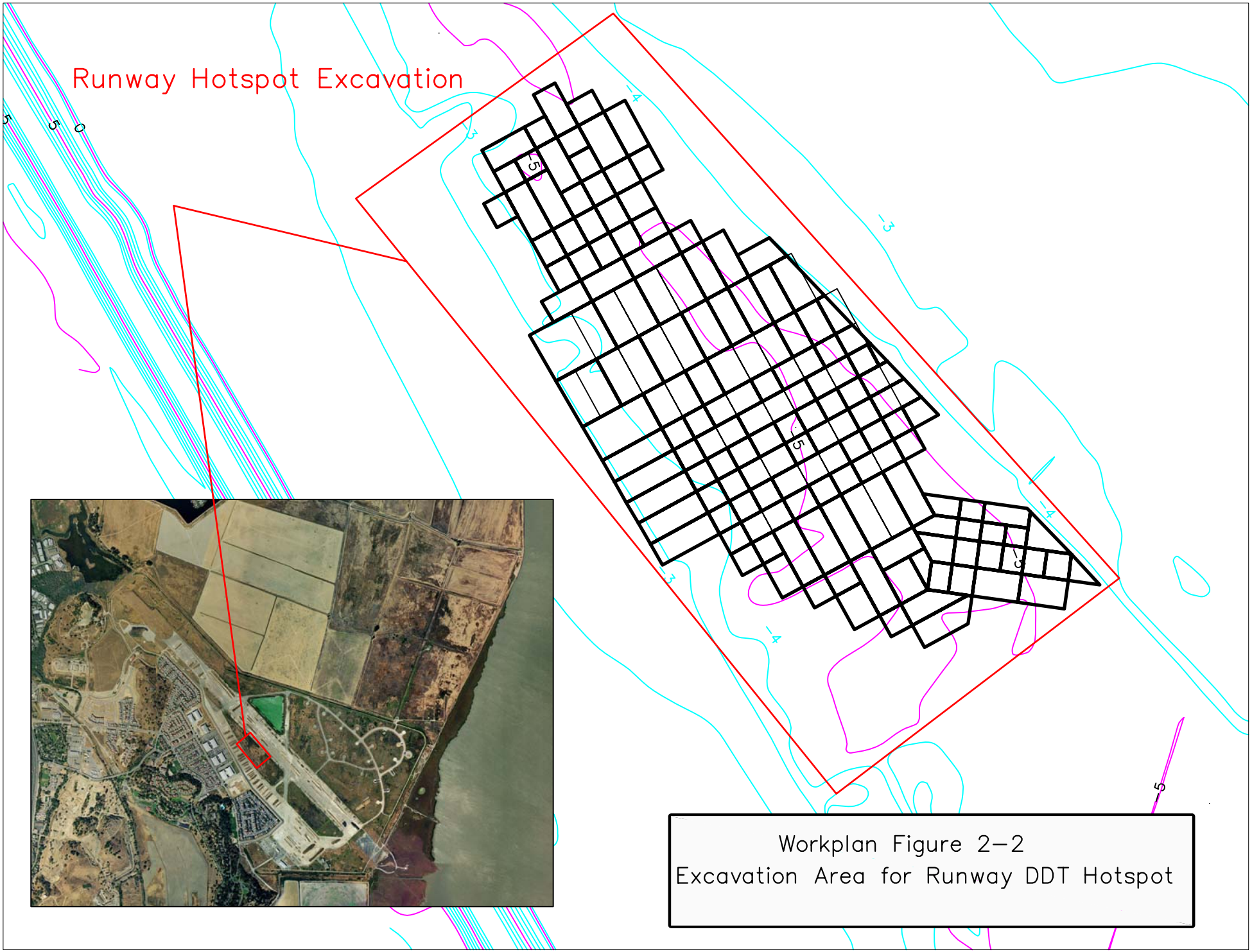
APPENDIX B FSP/QAPP



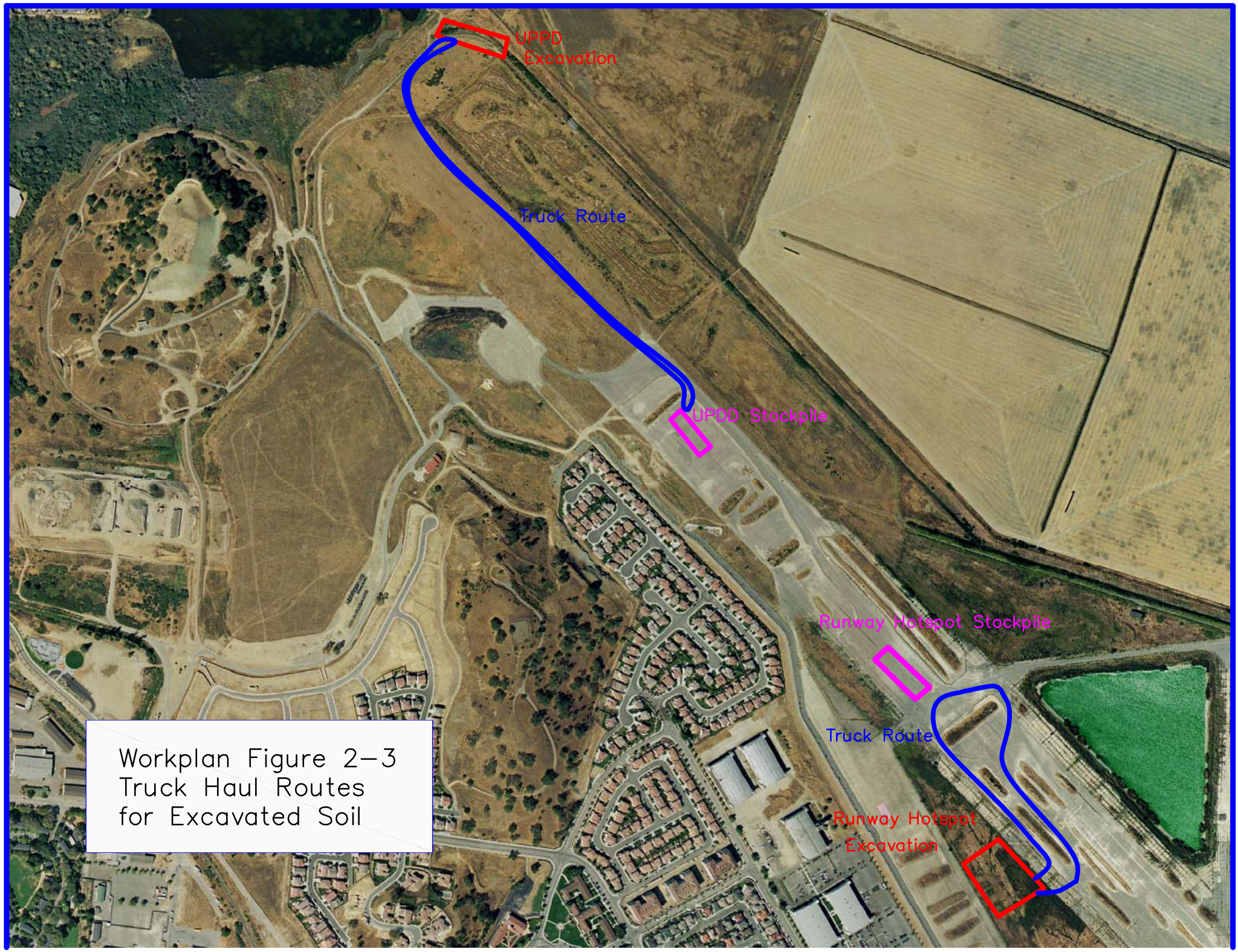
Workplan Figure 1–1,
HAAF Airfield Work Sites



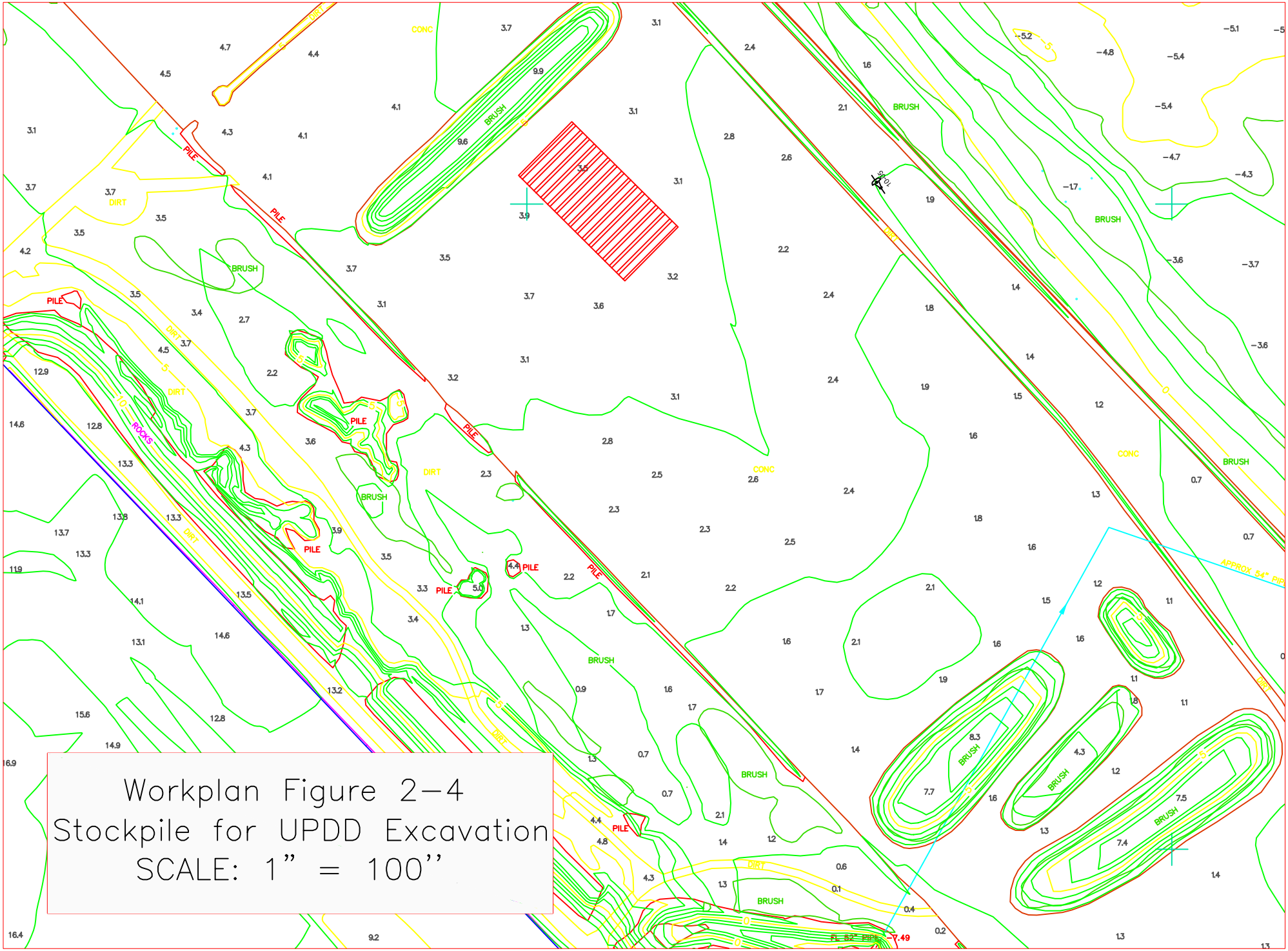
Workplan Figure 2−1
Excavation Area for UPDD



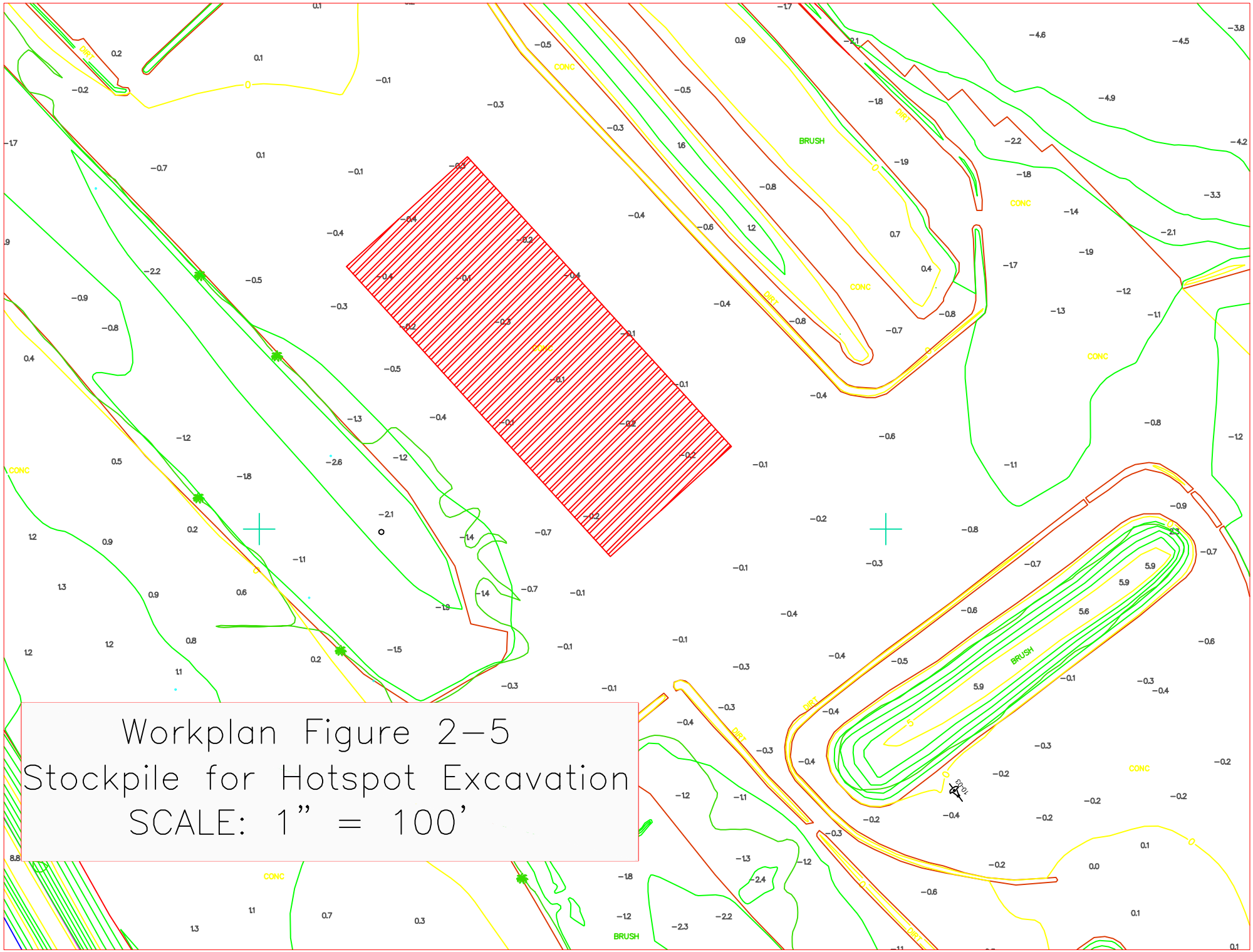
Workplan Figure 2–2
Excavation Area for Runway DDT Hotspot



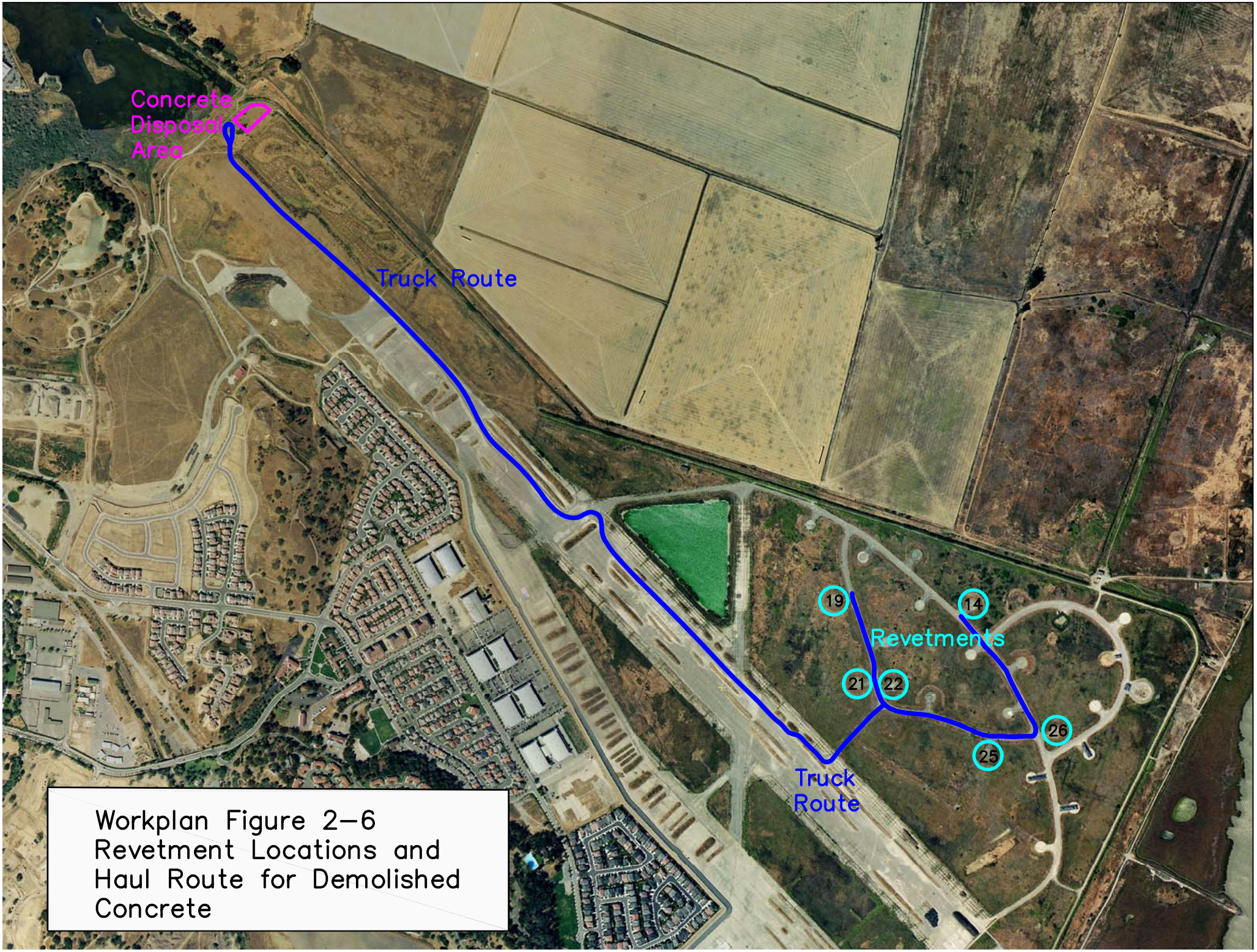
Workplan Figure 2–3
Truck Haul Routes
for Excavated Soil



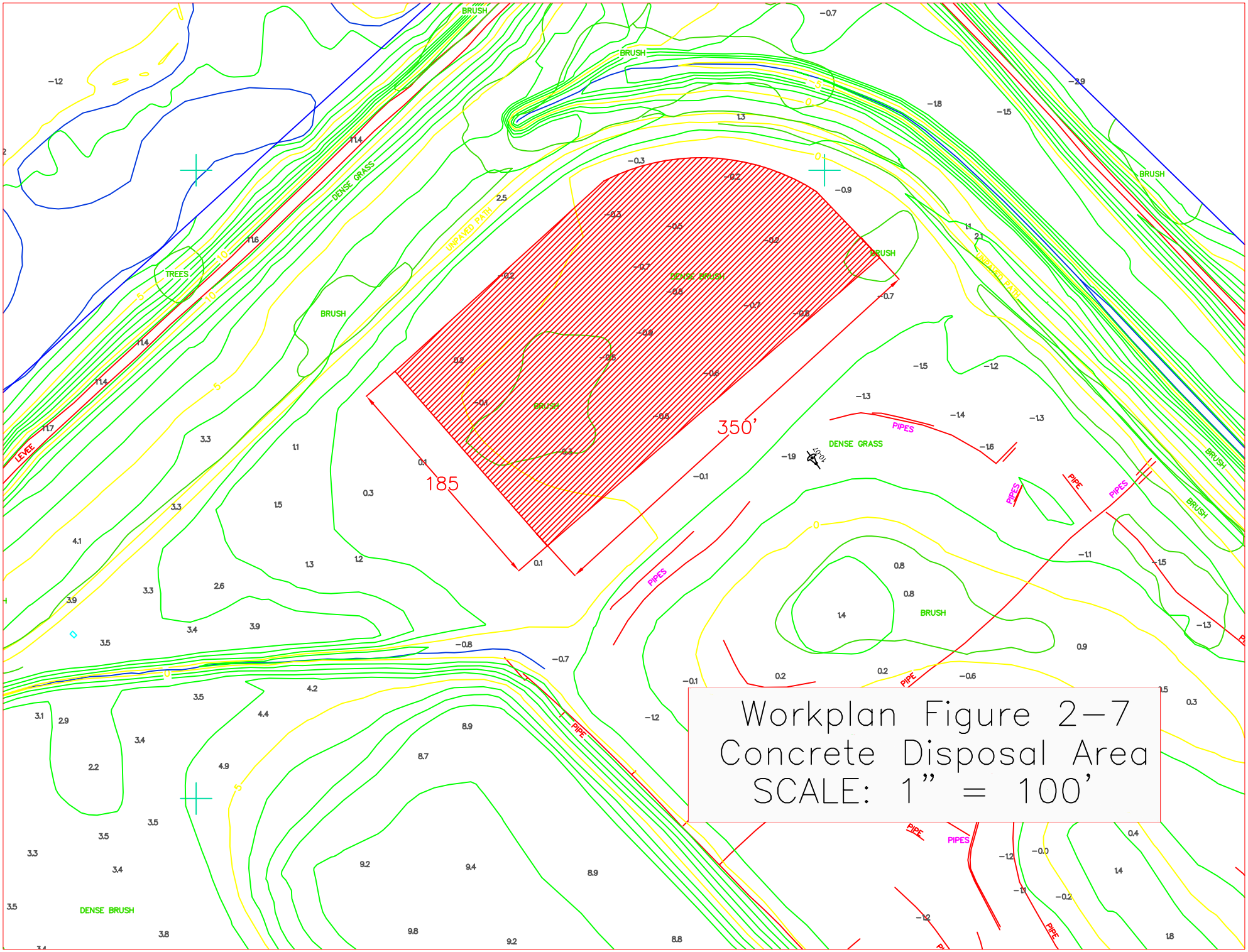
Workplan Figure 2–4
Stockpile for UPDD Excavation
SCALE: 1" = 100'



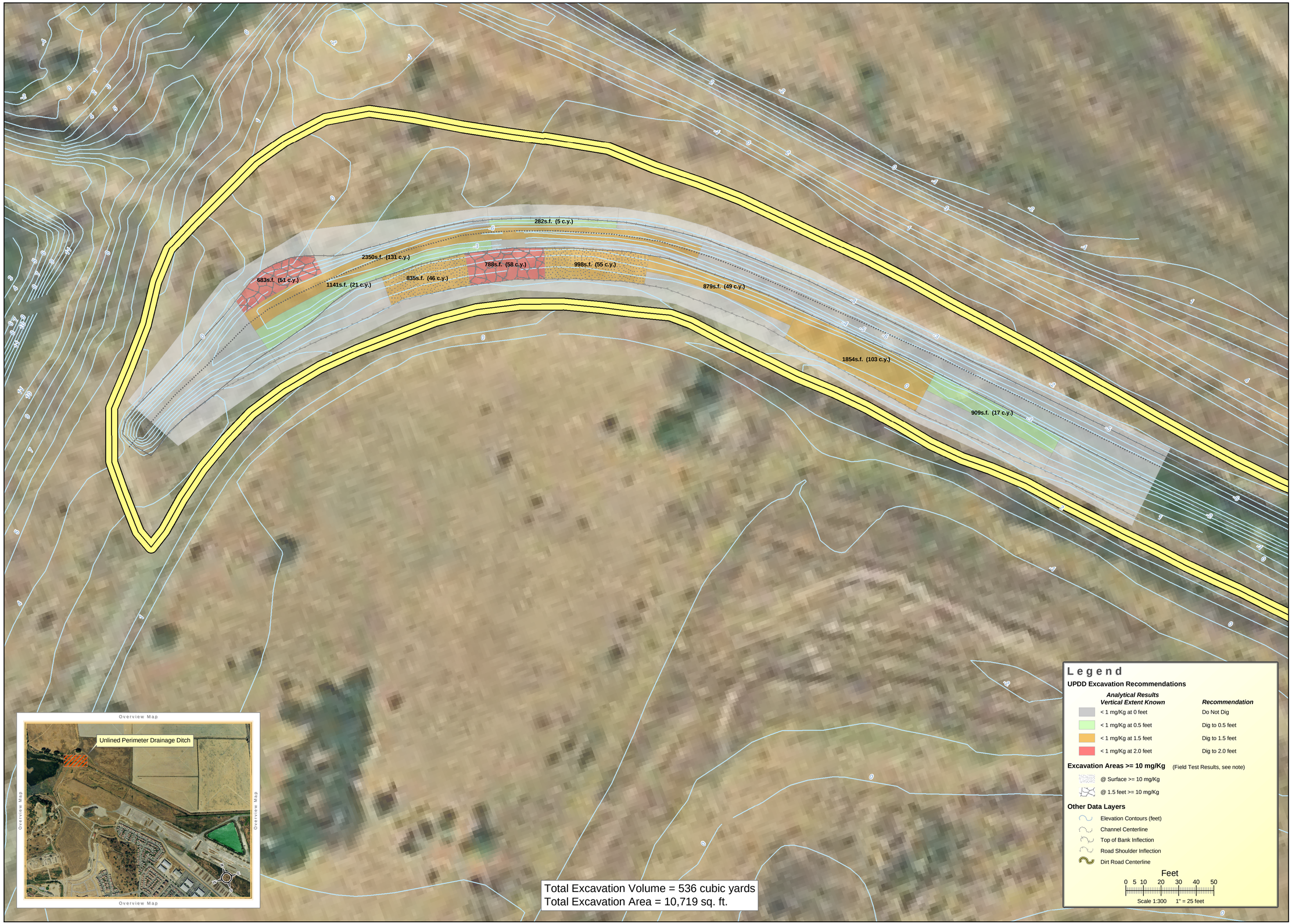
Workplan Figure 2–5
Stockpile for Hotspot Excavation
SCALE: 1” = 100’



Workplan Figure 2–6
Revetment Locations and Haul Route for Demolished Concrete



Workplan Figure 2–7
Concrete Disposal Area
SCALE: 1" = 100'



US Army Corps
of Engineers
Sacramento District
1325 J Street
Sacramento, CA 94805

Date:
July 21, 2004

Prepared by:
Michael O'Neill

NAD27 CA State Plane Zone III

Notes:
About the Patterns: The patterns used on this map indicate areas where field tests registered results greater than or equal to 10 mg/Kg. The simple presence of any pattern indicates that concentration was found at some depth below grade. The type of pattern represents the depth at which that concentration was found. The lack of any pattern indicates that no field test results measured greater than 10 mg/Kg.

California

Hamilton Army Airfield

BRAC Remediation Project

Unlined Perimeter Drainage Ditch (UPDD)

Soil Excavation Locations & Depths

Field Effort January, February, June 2004

Novato

Sheet Reference Number:

Figure 2-8

LocationCode	StartDepth	EndDepth	DepthUnits	Analyte Name	FinalResult	Qualifier	Result Units
UPDD-1202	0	0.25	Ft	TOTAL DDTS	1.00	E	mg/Kg
UPDD-1202	0.25	0.5	Ft	TOTAL DDTS	1.00	E	mg/Kg
UPDD-1202	0.75	1	Ft	TOTAL DDTS	10.00	E	mg/Kg
UPDD-1202	1.25	1.5	Ft	TOTAL DDTS	10.00	E	mg/Kg
UPDD-1202	1.75	2	Ft	TOTAL DDTS	1.00	U	mg/Kg
UPDD-1202	2.25	2.5	Ft	TOTAL DDTS	0.20	U	mg/Kg
UPDD-1224	0	0.25	Ft	TOTAL DDTS	1.00	U	mg/Kg
UPDD-1232	0.75	1	Ft	TOTAL DDTS	1.00	E	mg/Kg
UPDD-1232	1.25	1.5	Ft	TOTAL DDTS	1.00	U	mg/Kg
UPDD-1233	0	0.25	Ft	TOTAL DDTS	1.00	E	mg/Kg
UPDD-1233	0.25	0.5	Ft	TOTAL DDTS	1.00	U	mg/Kg
UPDD-1237	0	0.25	Ft	TOTAL DDTS	0.20	U	mg/Kg
UPDD-1238	0	0.25	Ft	TOTAL DDTS	1.00	E	mg/Kg
UPDD-1238	0.25	0.5	Ft	TOTAL DDTS	1.00	U	mg/Kg

LocationCode	StartDepth	EndDepth	DepthUnits	Analyte Name	FinalResult	Qualifier	Result Units
UPDD-1203	0	0.25	Ft	TOTAL DDTS	10.00	E	mg/Kg
UPDD-1203	0.25	0.5	Ft	TOTAL DDTS	1.00	E	mg/Kg
UPDD-1203	0.75	1	Ft	TOTAL DDTS	1.00	U	mg/Kg
UPDD-1203	1.75	2	Ft	TOTAL DDTS	1.00	U	mg/Kg
UPDD-1204	0	0.25	Ft	TOTAL DDTS	1.00	U	mg/Kg
UPDD-1220	0	0.25	Ft	TOTAL DDTS	1.00	E	mg/Kg
UPDD-1220	0.25	0.50	Ft	TOTAL DDTS	10.00	E	mg/Kg
UPDD-1220	0.75	1	Ft	TOTAL DDTS	10.00	E	mg/Kg
UPDD-1220	1.08	1.33	Ft	TOTAL DDTS	10.00	E	mg/Kg
UPDD-1229	0.75	1	Ft	TOTAL DDTS	1.00	E	mg/Kg
UPDD-1229	1.75	2	Ft	TOTAL DDTS	0.20	U	mg/Kg
UPDD-1230	0	0.25	Ft	TOTAL DDTS	0.20	U	mg/Kg
UPDD-1231	0	0.25	Ft	TOTAL DDTS	1.00	E	mg/Kg
UPDD-1231	0.75	1	Ft	TOTAL DDTS	0.20	U	mg/Kg
UPDD-1239	0	0.25	Ft	TOTAL DDTS	0.20	U	mg/Kg
UPDD-1240	0	0.25	Ft	TOTAL DDTS	1.00	E	mg/Kg
UPDD-1240	0.25	0.50	Ft	TOTAL DDTS	1.00	E	mg/Kg
UPDD-1240	0.75	1	Ft	TOTAL DDTS	1.00	E	mg/Kg

LocationCode	StartDepth	EndDepth	DepthUnits	Analyte Name	FinalResult	Qualifier	Result Units
UPDD-1208	0	0.25	Ft	TOTAL DDTS	0.20	U	mg/Kg
UPDD-1218	0.75	1	Ft	TOTAL DDTS	1.00		mg/Kg
UPDD-1218	1.25	1.5	Ft	TOTAL DDTS	1.00	U	mg/Kg

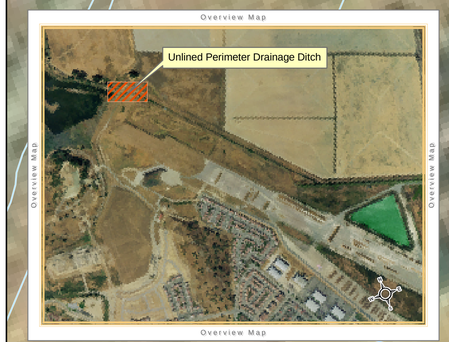
LocationCode	StartDepth	EndDepth	DepthUnits	Analyte Name	FinalResult	Qualifier	Result Units
UPDD-1209	0	0.25	Ft	TOTAL DDTS	1.00	E	mg/Kg
UPDD-1209	0.25	0.5	Ft	TOTAL DDTS	1.00	U	mg/Kg
UPDD-1209	0.75	1	Ft	TOTAL DDTS	1.00	E	mg/Kg
UPDD-1209	1.25	1.5	Ft	TOTAL DDTS	0.20	U	mg/Kg
UPDD-1209	1.75	2	Ft	TOTAL DDTS	0.20	U	mg/Kg
UPDD-1219	0	0.25	Ft	TOTAL DDTS	1.00	U	mg/Kg
UPDD-1225	0	0.25	Ft	TOTAL DDTS	1.00	E	mg/Kg
UPDD-1225	0.25	0.5	Ft	TOTAL DDTS	1.00	E	mg/Kg
UPDD-1225	0.75	1	Ft	TOTAL DDTS	1.00	U	mg/Kg
UPDD-1227	0.75	1	Ft	TOTAL DDTS	1.00	U	mg/Kg
UPDD-1228	0	0.25	Ft	TOTAL DDTS	0.20	U	mg/Kg

LocationCode	StartDepth	EndDepth	DepthUnits	Analyte Name	FinalResult	Qualifier	Result Units
UPDD-1200	0	0.25	Ft	TOTAL DDTS	0.20	U	mg/Kg
UPDD-1201	0	0.25	Ft	TOTAL DDTS	0.20	U	mg/Kg
UPDD-1221	0	0.25	Ft	TOTAL DDTS	0.20	U	mg/Kg
UPDD-1222	0.75	1	Ft	TOTAL DDTS	0.20	U	mg/Kg
UPDD-1223	0	0.25	Ft	TOTAL DDTS	0.20	U	mg/Kg
UPDD-1243	0	0.25	Ft	TOTAL DDTS	0.20	U	mg/Kg
UPDD-1244	0.75	1	Ft	TOTAL DDTS	0.20	U	mg/Kg

LocationCode	StartDepth	EndDepth	DepthUnits	Analyte Name	FinalResult	Qualifier	Result Units
UPDD-1205	0	0.25	Ft	TOTAL DDTS	10.00	E	mg/Kg
UPDD-1205	0.25	0.5	Ft	TOTAL DDTS	1.00	U	mg/Kg
UPDD-1205	0.75	1	Ft	TOTAL DDTS	1.00	E	mg/Kg
UPDD-1205	1.25	1.5	Ft	TOTAL DDTS	1.00	U	mg/Kg
UPDD-1205	1.75	2	Ft	TOTAL DDTS	1.00	U	mg/Kg
UPDD-1206	0	0.25	Ft	TOTAL DDTS	1.00	E	mg/Kg
UPDD-1206	0.75	1	Ft	TOTAL DDTS	1.00	U	mg/Kg
UPDD-1207	0	0.25	Ft	TOTAL DDTS	1.00	U	mg/Kg
UPDD-1207	0	0.25	Ft	TOTAL DDTS	1.00	E	mg/Kg
UPDD-1207	0.25	0.5	Ft	TOTAL DDTS	1.00	U	mg/Kg
UPDD-1234	0.25	0.5	Ft	TOTAL DDTS	1.00	U	mg/Kg
UPDD-1234	0.75	1	Ft	TOTAL DDTS	1.00	E	mg/Kg
UPDD-1235	0	0.25	Ft	TOTAL DDTS	1.00	E	mg/Kg
UPDD-1235	0.5	0.75	Ft	TOTAL DDTS	0.20	U	mg/Kg
UPDD-1236	0	0.25	Ft	TOTAL DDTS	1.00	U	mg/Kg
UPDD-1241	0	0.25	Ft	TOTAL DDTS	1.00	U	mg/Kg
UPDD-1242	0	0.25	Ft	TOTAL DDTS	1.00	E	mg/Kg
UPDD-1242	0.25	0.5	Ft	TOTAL DDTS	1.00	E	mg/Kg

LocationCode	StartDepth	EndDepth	DepthUnits	Analyte Name	FinalResult	Qualifier	Result Units
UPDD-1215	0	0.25	Ft	TOTAL DDTS	1.00	E	mg/Kg
UPDD-1215	0.25	0.5	Ft	TOTAL DDTS	0.20	U	mg/Kg
UPDD-1215	0.75	1	Ft	TOTAL DDTS	0.20	U	mg/Kg
UPDD-1216	0	0.25	Ft	TOTAL DDTS	0.20	U	mg/Kg
UPDD-1217	0	0.25	Ft	TOTAL DDTS	1.00	U	mg/Kg

LocationCode	StartDepth	EndDepth	DepthUnits	Analyte Name	FinalResult	Qualifier	Result Units
UPDD-1210	0	0.25	Ft	TOTAL DDTS	1.00	E	mg/Kg
UPDD-1210	0.25	0.5	Ft	TOTAL DDTS	1.00	E	mg/Kg
UPDD-1210	0.75	1	Ft	TOTAL DDTS	1.00	E	mg/Kg
UPDD-1210	1.25	1.5	Ft	TOTAL DDTS	0.20	U	mg/Kg
UPDD-1210	1.75	2	Ft	TOTAL DDTS	0.20	U	mg/Kg
UPDD-1211	0	0.25	Ft	TOTAL DDTS	1.00	E	mg/Kg
UPDD-1211	0.25	0.5	Ft	TOTAL DDTS	1.00	U	mg/Kg
UPDD-1211	0.75	1	Ft	TOTAL DDTS	1.00	U	mg/Kg
UPDD-1212	0	0.25	Ft	TOTAL DDTS	1.00	E	mg/Kg
UPDD-1212	0.25	0.5	Ft	TOTAL DDTS	1.00	U	mg/Kg
UPDD-1212	0.75	1	Ft	TOTAL DDTS	1.00	E	mg/Kg
UPDD-1212	1.25	1.5	Ft	TOTAL DDTS	1.00	U	mg/Kg
UPDD-1212	1.75	2	Ft	TOTAL DDTS	1.00	U	mg/Kg
UPDD-1213	0	0.25	Ft	TOTAL DDTS	1.00	E	mg/Kg
UPDD-1213	0.25	0.5	Ft	TOTAL DDTS	0.20	U	mg/Kg
UPDD-1213	0.75	1	Ft	TOTAL DDTS	0.20	U	mg/Kg
UPDD-1214	0	0.25	Ft	TOTAL DDTS	0.20	U	mg/Kg



Legend

UPDD Chemistry Results

Soil Sample Location (Jan, Feb, Jun 2004)

- Area Not Sampled
- < 1 mg/Kg at 0 Feet
- ≥ 1 mg/Kg at 0 Feet
- ≥ 1 mg/Kg at 0.5 Feet
- ≥ 1 mg/Kg at 1 Foot
- ≥ 1 mg/Kg at 1.5 Feet

Areas w/Field Results ≥ 10 mg/Kg (See note)

- @ Surface ≥ 10 mg/Kg
- @ 1.5 ft. ≥ 10 mg/Kg

Other Data Layers

- 1' Elevation Contours
- Channel Centerline
- Top of Bank Inflection
- Road Shoulder Inflection
- Dirt Road Centerline

Feet 0 5 10 20 30 40 50

Note: Tables are explained in report.

Scale 1:300 1"= 25 feet

US Army Corps of Engineers
Sacramento District
1325 J Street
Sacramento, CA 94805

Date: July 26, 2004

Prepared by: Michael O'Neill

NAD27 CA State Plane Zone III

Notes:
About the Patterns: The patterns used on this map indicate areas where field tests registered results greater than or equal to 10 mg/Kg. The simple presence of any pattern indicates that concentration was found at some depth at or below grade. The type of pattern represents the depth at which that concentration was found. The lack of any pattern indicates that no field test results measured greater than or equal to 10 mg/Kg.

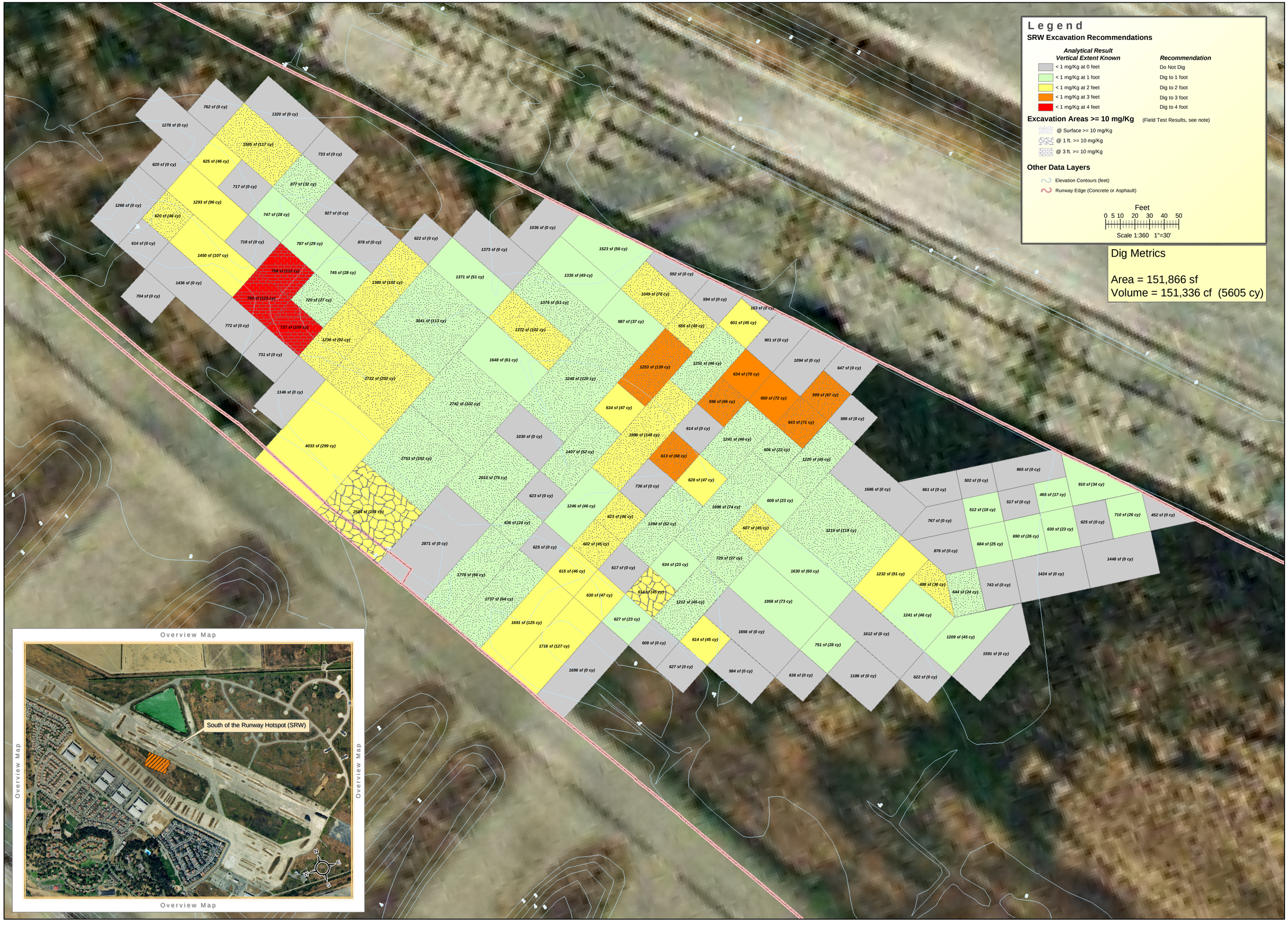
Tables are explained in the report.

California
Novato

Hamilton Army Airfield
BRAC Remediation Project
Unlined Perimeter Drainage Ditch (UPDD)
Total DDTs Concentrations
Field Effort January, February, June 2004

Sheet Reference Number:

Figure 2-9



US Army Corps of Engineers
Sacramento District
1325 J Street
Sacramento, CA 94805

Date: July 21, 2004

Prepared by: Michael O'Neill

NAD83 CA State Plane Zone III

Notes:
About the Patterns: The patterns used on this map indicate areas where field tests registered results greater than or equal to 10 mg/Kg. The simple presence of any pattern indicates that concentration was found at some depth below grade. The type of pattern represents the depth at which that concentration was found. The lack of any pattern indicates that no field test results measured greater than 10 mg/Kg.

Novato, California

Hamilton Army Airfield

BRAC Remediation Project
South of the Runway
Soil Excavation Location & Depth
Field Effort January, February, June 2004

Sheet Reference Number:

Figure 2-10

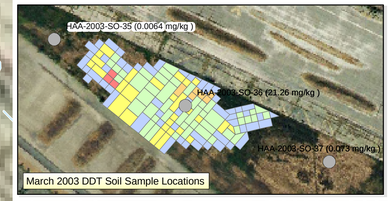
LocationCode	Depth		Result
SRW-1301	0.25	<	0.20
SRW-1302	0.25	<	0.20
SRW-1303	0.25	>	1.00
SRW-1303	1	<	0.20
SRW-1303	2	<	0.20
SRW-1304	0.25	>	10.00
SRW-1304	1	<	0.20
SRW-1304	2	<	0.20
SRW-1305	0.25	>	10.00
SRW-1306	0.25	>	1.00
SRW-1307	0.25	>	1.00
SRW-1308	0.25	>	1.00
SRW-1308	1	<	0.20
SRW-1308	2	<	0.20
SRW-1309	0.25	>	10.00
SRW-1309	1	<	0.20
SRW-1309	2	<	0.20
SRW-1310	0.25	>	10.00
SRW-1310	2	<	0.40
SRW-1311	0.25	>	1.00
SRW-1311	1	<	0.20
SRW-1311	2	<	0.20
SRW-1312	0.25	>	10.00
SRW-1312	1	<	0.20
SRW-1312	2	<	0.20
SRW-1313	0.25	>	10.00
SRW-1314	0.25	>	1.00
SRW-1315	0.25	<	0.20
SRW-1316	0.25	>	10.00
SRW-1317	0.25	>	1.00
SRW-1317	1	<	0.20
SRW-1317	2	<	0.20
SRW-1318	0.25	>	10.00
SRW-1318	1	<	0.20
SRW-1318	2	<	0.20
SRW-1319	0.25	<	1.00
SRW-1320	0.25	<	0.20
SRW-1321	0.25	>	10.00
SRW-1321	1	>	2.00
SRW-1322	0.25	>	10.00
SRW-1322	1	>	1.00
SRW-1322	2	>	1.00
SRW-1323	0.25	>	1.00
SRW-1323	2	<	0.20
SRW-1324	0.25	>	10.00
SRW-1324	1	<	1.00
SRW-1325	0.25	<	1.00
SRW-1326	0.25	<	0.20
SRW-1327	0.25	>	1.00

LocationCode	Depth		Result
SRW-1346	1	<	0.20
SRW-1346	2	<	0.20
SRW-1347	0.25	>	10.00
SRW-1347	1	<	0.20
SRW-1347	2	<	0.20
SRW-1348	0.25	<	0.20
SRW-1349	0.25	<	0.20
SRW-1350	0.25	>	1.00
SRW-1350	1	<	0.20
SRW-1350	2	<	0.20
SRW-1351	0.25	>	1.00
SRW-1351	1	<	1.00
SRW-1352	0.25	>	10.00
SRW-1352	1	<	0.20
SRW-1352	2	<	0.20
SRW-1353	0.25	<	1.00
SRW-1354	0.25	<	0.40
SRW-1355	0.25	<	0.20
SRW-1356	0.25	<	1.00
SRW-1357	0.25	<	1.00
SRW-1410	0.25	>	10.00
SRW-1411	0.25	<	1.00
SRW-1412	3	<	0.40
SRW-1413	0.25	<	1.00
SRW-1414	0.25	<	0.20
SRW-1415	0.25	>	1.00
SRW-1416	0.25	>	20.00
SRW-1417	0.25	>	10.00
SRW-1417	1	>	1.00
SRW-1418	0.25	>	10.00
SRW-1418	1	>	1.00
SRW-1419	0.25	<	0.20
SRW-1420	1	<	2.00
SRW-1421	0.25	>	10.00
SRW-1422	0.25	>	1.00
SRW-1422	1	<	1.00
SRW-1423	0.25	>	1.00
SRW-1423	1	>	1.00
SRW-1423	2	<	0.20
SRW-1424	0.25	>	1.00
SRW-1424	1	=	1.00
SRW-1425	0.25	>	1.00
SRW-1425	1	<	1.00
SRW-1426	0.25	>	10.00
SRW-1427	0.25	>	10.00
SRW-1428	0.25	=	0.20
SRW-1429	1	<	0.40
SRW-1430	1	>	10.00
SRW-1430	2	<	1.00
SRW-1431	1	>	1.00

LocationCode	Depth		Result
SRW-1327	1	<	0.20
SRW-1327	2	<	0.20
SRW-1328	0.25	>	10.00
SRW-1328	1	>	1.00
SRW-1328	2	<	0.20
SRW-1329	0.25	>	10.00
SRW-1329	1	<	0.20
SRW-1329	2	<	0.20
SRW-1330	1	>	1.00
SRW-1330	2	<	0.20
SRW-1331	0.17	=	21.26
SRW-1331	0.67	=	7.36
SRW-1331	1.33	=	2.73
SRW-1331	2	=	1.99
SRW-1331	3	<	0.20
SRW-1332	0.25	<	2.00
SRW-1333	0.25	>	10.00
SRW-1333	1	<	0.20
SRW-1333	2	<	0.20
SRW-1334	0.25	>	1.00
SRW-1334	1	<	2.00
SRW-1334	2	<	0.20
SRW-1335	0.25	>	10.00
SRW-1335	1	<	0.20
SRW-1335	2	<	0.40
SRW-1336	0.25	<	1.00
SRW-1337	0.25	>	1.00
SRW-1337	1	>	10.00
SRW-1337	2	=	0.20
SRW-1338	0.25	>	1.00
SRW-1338	1	<	0.20
SRW-1338	2	<	0.20
SRW-1339	0.25	>	10.00
SRW-1339	1	<	0.20
SRW-1339	2	<	0.20
SRW-1340	0.25	>	10.00
SRW-1340	1	<	0.20
SRW-1340	2	<	0.20
SRW-1341	0.25	>	10.00
SRW-1341	1	>	2.00
SRW-1342	0.25	<	0.20
SRW-1343	0.25	>	10.00
SRW-1343	1	<	1.00
SRW-1343	2	<	0.20
SRW-1344	0.25	>	1.00
SRW-1344	1	<	0.20
SRW-1344	2	<	0.20
SRW-1345	0.25	>	10.00
SRW-1345	2	<	0.40
SRW-1346	0.25	>	10.00

LocationCode	Depth		Result
SRW-1432	1	<	1.00
SRW-1433	0.25	<	1.00
SRW-1434	1	>	1.00
SRW-1435	1	>	1.00
SRW-1436	0.25	<	1.00
SRW-1437	0.25	>	1.00
SRW-1437	1	<	1.00
SRW-1438	0.25	>	10.00
SRW-1438	1	<	1.00
SRW-1439	0.25	>	10.00
SRW-1439	1	>	1.00
SRW-1440	0.25	>	10.00
SRW-1441	0.25	>	2.00
SRW-1442	0.25	>	1.00
SRW-1443	0.25	<	1.00
SRW-1444	0.25	<	0.40
SRW-1445	0.25	>	20.00
SRW-1445	1	>	1.00
SRW-1446	0.25	<	2.00
SRW-1446	1	<	1.00
SRW-1447	0.25	<	1.00
SRW-1448	0.25	<	1.00
SRW-1449	0.25	<	0.20
SRW-1450	0.25	<	0.20
SRW-1451	0.25	<	0.20
SRW-1452	0.25	=	10.00
SRW-1453	0.25	>	1.00
SRW-1454	0.25	>	1.00
SRW-1455	0.25	>	10.00
SRW-1456	0.25	>	1.00
SRW-1457	0.25	>	1.00
SRW-1458	0.25	>	1.00
SRW-1459	0.25	>	1.00
SRW-1460	0.25	=	0.20
SRW-1461	0.25	>	1.00
SRW-1462	0.25	<	1.00
SRW-1463	0.25	<	1.00
SRW-1464	0.25	<	1.00
SRW-1465	0.25	>	1.00
SRW-1466	0.25	<	1.00
SRW-1467	0.25	>	1.00
SRW-1468	0.25	<	0.20
SRW-1469	0.25	<	0.20
SRW-1470	0.25	<	0.20
SRW-1471	0.25	<	0.20
SRW-1472	0.25	>	10.00
SRW-1473	0.25	<	0.20
SRW-1474	0.25	>	10.00
SRW-1475	0.25	<	1.00
SRW-1476	0.25	<	1.00
SRW-1477	0.25	>	10.00

LocationCode	Depth		Result
SRW-1478	0.25	>	1.00
SRW-1479	0.25	>	1.00
SRW-1480	0.25	>	1.00
SRW-1481	0.25	<	0.20
SRW-1482	0.25	>	1.00
SRW-1483	0.25	<	0.20
SRW-1484	0.25	<	1.00
SRW-1485	0.25	>	1.00
SRW-1486	0.25	<	0.20
SRW-1487	0.25	<	1.00
SRW-1488	0.25	>	10.00
SRW-1489	0.25	<	1.00
SRW-1490	0.25	<	1.00
SRW-1491	0.25	<	1.00
SRW-1492	0.25	<	1.00
SRW-1493	0.25	>	1.00
SRW-1494	0.25	<	1.00
SRW-1495	1	<	1.00
SRW-1496	2	<	0.20
SRW-1497	1	>	1.00
SRW-1497	2	<	0.20
SRW-1498	1	>	1.00
SRW-1498	2	<	0.20
SRW-1499	2	=	0.20
SRW-1500	2	<	1.00
SRW-1501	1	>	1.00
SRW-1501	2	<	1.50
SRW-1501	3	<	0.30
SRW-1502	2	>	1.00
SRW-1502	3	<	0.20
SRW-1503	1	<	0.20
SRW-1504	1	<	1.00
SRW-1505	1	<	0.20
SRW-1506	1	>	10.00
SRW-1506	2	>	10.00
SRW-1506	3	>	10.00
SRW-1506	4	<	0.20
SRW-1507	1	<	0.20
SRW-1508	1	>	1.00
SRW-1508	2	<	0.20
SRW-1509	1	>	1.00
SRW-1509	2	<	1.00
SRW-1510	0.25	<	1.00
SRW-1511	0.25	>	1.00
SRW-1512	1	<	1.00
SRW-1512	2	<	1.00
SRW-1513	0.25	>	1.00
SRW-1514	0.25	<	1.00
SRW-1515	0.25	<	1.00
SRW-1516	1	<	0.20
SRW-1520	1	<	1.00



Legend

SRW Chemistry Results

Soil Area Contamination Assessment
- < 1 mg/Kg at 0 Feet
- ≥ 1 mg/Kg at 0 Feet
- ≥ 1 mg/Kg at 1 Feet
- ≥ 1 mg/Kg at 2 Feet
- ≥ 1 mg/Kg at 3 Feet

Soil Sample Location/Concentration
- < 1 mg/Kg at 0.0 Feet
- ≥ 1 mg/Kg at 0 Feet
- ≥ 1 mg/Kg at 1 Feet
- ≥ 1 mg/Kg at 2 Feet
- ≥ 1 mg/Kg at 3 Feet

Areas w/Field Results ≥ 10 mg/Kg (See note)
- @ Surface ≥ 10 mg/Kg
- @ 1.0 ft. ≥ 10 mg/Kg
- @ 3.0 ft. ≥ 10 mg/Kg

Other Data Layers
- Grouped Areas Sharing a Depth Soil Sample Location
- Elevation Contours (feet)
- Runway Concrete/Asphalt Edge

Feet
0 15 30 60 90 120

Scale 1:420 1" = 35 ft.
Note: Tables are explained in report.

US Army Corps of Engineers
Sacramento District
1325 J Street
Sacramento, CA 94805

Date: July 26, 2004

Prepared by: Michael O'Neill

N
W E
S

NAD27 CA State Plane Zone III

Notes:
About the Patterns: The patterns used on this map indicate areas where field tests registered results greater than or equal to 10 mg/Kg. The simple presence of any pattern indicates that concentration was found at some depth at or below grade. The type of pattern represents the depth at which that concentration was found. The lack of any pattern indicates that no field test results measured greater than or equal to 10 mg/Kg.

Tables are explained in report.

Novato

California

Hamilton Army Airfield

BRAC RemediationProject

South of the Runway Total DDTs Concentrations

Field Effort January, February, June 2004

Sheet Reference Number:

Figure 2-11

DEPARTMENT OF THE ARMY
BASE REALIGNMENT AND CLOSURE
ATLANTA FIELD OFFICE
BRAC ENVIRONMENTAL COORDINATOR
HAMILTON ARMY AIRFIELD
1 BURMA ROAD
NOVATO, CALIFORNIA 94949

July 30, 2004

DAIM-BO-A-HA

Subject: Forwarding *Appendix A Storm Water Pollution Prevention Plan*, Hamilton Army Airfield, Novato, CA.

Ms. Naomi Feger
Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612

Dear Ms. Feger,

The Army is pleased to provide *Appendix A Storm Water Pollution Prevention Plan*, Hamilton Army Airfield, Novato, CA.

This submittal complies with Finding 23 and satisfies Task 17 of Board Order No. R2-2003-0076 Site Cleanup Requirements (SCR) for the Unlined Perimeter Drainage Ditch, South of the Runway DDT Hotspot and Revetment Demolition.

This document is being submitted to the RWQCB in accordance with SCR provision C8. It is also being distributed in accordance with SCR provision C9 for information.

To support fieldwork this Fall, I request your response by August 27, 2004. If you have any questions, please contact me at (415) 883-6386.

Sincerely,

Edward Keller, P.E.
BRAC Environmental Coordinator
Hamilton Army Airfield

Enclosure
Copies Furnished:

L. McMahan (DTSC)
D. Diebert (DTSC)
J. Browning (USFWS)
B. Stanton (USFWS)
L. Sullivan (NOAA)
J. Yamamoto (CDFG)
J. Hardwick (CDFG)
T. Gandesbery (CSCC)
S. Goldbeck (BCDC)
R. Zimny (USACE)
D. Doak (USACE - SPN)
BRAC office files

Distribution List
Appendix A Storm Water Pollution Prevention Plan
Hamilton Army Airfield, Novato, CA

July 2004

# COPIES	NAME	COMPANY	ADDRESS	CITY AND STATE	ZIP	PHONE AND FAX NUMBER
1hc + 1cd	Ed Keller, PE Edward.Keller@usace.army.mil	Department of the Army BRAC Environmental Coordinator	Hamilton Army Airfield 1 Burma Road Novato, CA 94949	Novato, CA	94949	Ph: (415) 883-6386 FAX: (415) 883-1033 Cell: (415) 250-8472
2 hc + 2 cd	Joy Lanzaro Joy.L.Lanzaro@usace.army.mil	BRAC Environmental Office – HAAF	Hamilton Army Airfield 1 Burma Road Novato, CA 94949	Novato, CA	94949	Ph: (415) 883-6386 FAX: (415) 883-1033
1hc + 1cd	Hugh Ashley Hugh.T.Ashley@usace.army.mil	BRAC Environmental Office – HAAF	Hamilton Army Airfield 1 Burma Road Novato, CA 94949	Novato, CA	94949	Ph: (415) 883-1016 FAX: (415) 883-1033
1hc + 1cd	Naomi Feger Nlf@rb2.swrcb.ca.gov	San Francisco Bay Regional Water Quality Control Board	1515 Clay Street, Suite 1400	Oakland, CA	94612	Ph: (510) 622-2328 FAX: (510) 622-2460
1 cd	Donn Diebert DDiebert@dtsc.ca.gov	California Environmental Protection Agency Department of Toxic Substances Control	Region 1-Site Mitigation Branch 8800 Cal Center Drive	Sacramento, CA	95827	Ph: (916) 255-3728
1 cd	Lance McMahan LMcmaha1@dtsc.ca.gov	California Environmental Protection Agency Department of Toxic Substances Control	Region 1-Site Mitigation Branch 8800 Cal Center Drive	Sacramento, CA	95827	Ph: (916) 255-3674 FAX: (916) 255-3697
1 cd	Jim Hardwick JHARDWIC@OSPR.DFG.CA.GOV	Department of Fish and Game	1700 K Street Ste. 250	Sacramento, CA	95814	Ph: (916) 327-0911
1 cd	Julie Yamamoto jyamamot@OSPR.DFG.CA.GOV	California Department of Fish and Game, OSPR	1700 K Street, Suite 250	Sacramento, CA	95814	Ph: (916) 323-4428 FAX: (916) 324-8829
1 cd	Jim Browning James_A_Browning@fws.gov	US Fish and Wildlife Service	2800 Cottage Way, Suite W-2605	Sacramento, CA	95825 -1846	Ph: (916) 414-6649 FAX: (916) 414-6712
1 cd	Laurie Sullivan laurie.sullivan@noaa.gov	NOAA CRC Program c/o USEPA, Region IX	Mail Code H-8-5 75 Hawthorne Street	San Francisco, CA	94105	Ph: (415) 972-3210 FAX: (415) 972-3211
1 cd	Ray Zimny Raymond.E.Zimny@usace.army.mil	USACE Sacramento District Attention: CESPK-ED-E	1325 "J" Street 12th Floor	Sacramento, CA	95814 -2922	Ph: (916) 557-6965 FAX: (916) 557-7865
1 cd	David Doak david.v.doak@spd02.usace.army.mil	S.F. District USACE CE-SPN-PPMD	333 Market Street, 8th Floor	San Francisco, CA	94105	Ph: (415) 977-8562 FAX: (415) 977-8431
1 cd	Tom Gandesbery tgandesbery@scc.ca.gov	California State Coastal Conservancy	1330 Broadway Street, Ste 1100	Oakland, CA	94612	Ph: (510) 286-7028 FAX: (510) 286-0470
2 cds	Victor Bonilla	US Army BRAC	ATTN: AFPI-BC	Fort	30330	Ph: (404) 464-6346

Distribution List
Appendix A Storm Water Pollution Prevention Plan
Hamilton Army Airfield, Novato, CA

July 2004

# COPIES	NAME	COMPANY	ADDRESS	CITY AND STATE	ZIP	PHONE AND FAX NUMBER
	bonillav@forscom.army.mil	Atlanta Field Office	1777 Hardee Avenue SW, Bldg 200	McPherson, GA	-1062	FAX: (404) 464-7040
1 cd	Steve Goldbeck steveg@bcdc.ca.gov	Bay Conservation and Development Commission	50 California Street 26th floor	San Francisco, CA	94111	Ph: (415) 352-3611
1 cd	Beckye Stanton Beckye_stanton@fws.gov	US Fish and Wildlife Service	2800 Cottage Way W 2650	Sacramento, CA	95825	Ph: (916) 414-6602 FAX: (916) 414-6713
1 cd	Eric Polson	California State Coastal Conservancy	32 Upland Drive	Petaluma, CA	94952	Ph: (916) 801-6290

APPENDIX A

STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

Hamilton Army Airfield Soil Remediation and Wetland Restoration

FOR
HAMILTON ARMY AIRFIELD
NOVATO, CALIFORNIA

SACRAMENTO USACE

July 26, 2004

STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

Prepared for Compliance with the National Pollutant Discharge Elimination System (NPDES) and California's General Permit for Storm Water Discharges Associated with Construction Activity

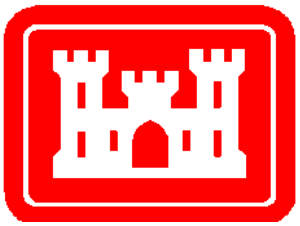
PROJECT: HAMILTON ARMY AIRFIELD SOIL REMEDIATION AND WETLAND RESTORATION

LOCATION: NOVATO, CA

CONTRACT:

DATE CERTIFIED BY CONTRACTOR:_____

CONTRACTOR:	**GOVERNMENT AGENCY:**
_____	US Army Corps of Engineers
_____	1325 J Street
_____	Sacramento, CA 95814



PROJECT WDID NUMBER 221C326821

DATE APPROVED BY USACE _____

TABLE OF CONTENTS PAGE

STORM WATER POLLUTION PREVENTION PLAN

1. OBJECTIVES

This Storm Water Pollution Prevention Plan (SWPPP) is intended to meet the California General Permit requirements for construction projects regulated under the National Pollutant Discharge Elimination System (NPDES) for Discharges of Storm Water Runoff associated with Construction Activity.

Provision 4 of the General Permit requires that this SWPPP must be prepared in accordance with the format described in Section A of the General Permit. The SWPPP must (a) identify all pollutant sources including sources of sediment that may affect the quality of storm water discharges; (b) identify non-storm water discharges; (c) identify and implement the Best Management Practices (BMPs) during construction, (d) include an implementation time schedule, (e) include a maintenance schedule designed to reduce or eliminate pollutants after the construction is completed, and (f) include certification of the SWPPP.

Provision 15 of the General Permit requires that a monitoring program be implemented for sites that may impair water bodies by contributing pollutants that are not visible. This provision requires that a Sampling and Analysis Plan be implemented to monitor discharges from the general construction area. The responsibility for sampling is with the Government construction representatives during this contract. There is a storm water monitoring program in place that calls for samples to be taken at the Pump Station prior to discharge to the Bay. The contractor is responsible for being aware and knowledgeable of the sampling and informing the Government construction representative if a breach of the storm water pollution prevention measures has occurred and sampling is required.

For the purpose of this SWPPP, the prime construction contractor shall be designated as the “discharger” since the prime construction contractor has direct control to minimize any potential stormwater discharge during construction. The US Army Corps of Engineers shall be designated as the “government” in this SWPPP. The discharger (i.e. the prime construction contractor) shall designate a Primary SWPPP coordinator who has the direct authority and the primary responsibility to implement the requirements of this SWPPP. A Secondary SWPPP coordinator shall also be identified who will assume the SWPPP coordinator’s responsibilities in the event the Primary SWPPP coordinator is absent or not on-site. After the contract is awarded, the names of the Contractor’s Primary and Secondary SWPPP coordinators shall be identified in Section 13 of this SWPPP.

2. IMPLEMENTATION SCHEDULE

A Notice of Intent (NOI) to obtain coverage under the General Permit has been obtained by the government and the Receipt of the NOI and the Waste Discharge ID (WDID) number is 221C326821 The General Permit and the contract require that this SWPPP must be completed and certified.

The contract specification (Section 01356A) specifies that this SWPPP shall be reviewed by the discharger (prime construction contractor) for applicability. After verifying applicability, the following must be completed by the discharger prior to any soil disturbing activity:

(1) Completion of project, location, contract, contractor on the front cover.
(2) Identification of Imported Material and BMPs in Sections 5E and 5F.
(3) Coordination of Sampling Analysis Plan discussed in Sections 5G.
(4) Identification of the Primary and Secondary SWPPP coordinators and their Stormwater Pollution Prevention training in Sections 12 and 13.
(5) Attaching a construction schedule for BMP installation in Section 14.
(6) SWPPP Certification in Section 16.
(7) Obtaining Government approval in Section 16.

During construction, the discharger is responsible for recognizing any changes in the project, which may affect this SWPPP or increases the risk of Storm Water Pollution (such as a lack of a BMP to address a potential Storm Water Pollution risk that develops during actual construction). The discharger is required to implement a new BMP and amend this SWPPP in accordance with Section 4 of this SWPPP in order to eliminate or minimize the risk of stormwater pollution. The discharger is also required to complete the attached Site Inspection/Maintenance/Repair Form during construction as described in Section 11.

After construction, the contract specification will require the government to conduct maintenance and periodic field inspections during a revegetation establishment period. The requirements of the General Permit shall apply until the end of this revegetation period. The annual fees to maintain coverage by the General Permit and submitting the Notice of Termination (NOT) are the responsibilities of the government. During this revegetation establishment period, the government is still responsible to maintain the stormwater pollution prevention requirements of the General Permit. If another contractor is responsible for revegetation, this SWPPP may be terminated by the government by a written memorandum after the vegetation contractor has certified a new SWPPP.

Prior to submitting a NOT at the end of the revegetation establishment period, the government is required to perform a final walk-through inspection to ensure no unpermitted stormwater discharge will occur. Section 7 provides the inspection standards. The government will ensure that all inspection and recording requirements in

Section 10 (post-construction stormwater management plan) have been met prior to submitting the NOT.

3. AVAILABILITY

The SWPPP shall be available at the construction site while the site is under construction during working hours, commencing with the initial construction activity and ending with the termination of coverage under the General Permit. The SWPPP shall be located at an accessible and known location in the on-site office. The original SWPPP should be secured while a copy may be posted for accessibility. The SWPPP must be readily accessible to any worker, public visitor, or inspector from the state or regional water quality control board during working hours, commencing with the initial construction activity and ending with termination of coverage under the General Permit. When the on-site office is closed, an emergency telephone number (24 hour) shall be clearly posted for situations other than those requiring 911. This emergency telephone number must give the caller access to the site superintendent and/or SWPPP coordinator.

This SWPPP should be made available to the public under Section 308(b) of the Clean Water Act.

In addition to this SWPPP and the General Permit, the discharger is required to maintain a daily field logbook and a three ring binder to file the completed inspection records described by Section 11. The daily field logbook and completed inspection records are normally maintained by the construction foreman or SWPPP coordinator and must be made available when requested.

The original SWPPP shall be available on site until a written memorandum is issued by the government to terminate the contractor's obligation to the SWPPP. The original SWPPP, Inspection Records and logbook shall then be delivered to the government for record keeping as part of the project completion report.

The contractor shall be aware that a visitor from the RWQCB, SWRCB, DWR, EPA and the Corps of Engineers has the right to inspect the site at any time and have immediate access to the SWPPP. The Corps of Engineers will assume the responsibility for producing copies for the regulatory agencies and may borrow the original SWPPP for this purpose. The contractor shall brief all on-site employees on the location of the SWPPP, and who the primary and secondary SWPPP coordinators are. On-site employees shall be briefed to direct any visitor from any regulatory agency to the SWPPP coordinator. The SWPPP coordinator should notify the Corps of Engineers immediately that a visitor from a regulatory agency is on-site.

4. REQUIRED CHANGES

REQUIRED CHANGES PRIOR TO CONSTRUCTION: As specified by the contract specification (Section 01356A), the discharger shall review this Preliminary SWPPP to verify applicability and fill in any blank information needed to complete the SWPPP as identified previously in Section 2. The SWPPP must be certified by the discharger and then submitted to the government for approval. Government approval is required prior to any soil disturbing activities and is indicated by a signature and Date on the cover of the SWPPP (below the castle). The Waste Discharge ID number (WDID) will be completed by the government. The original SWPPP with the original Signatures shall be returned to the discharger for implementation and must meet the availability requirements per Section 3.

REQUIRED CHANGES DURING CONSTRUCTION: The discharger shall amend this SWPPP during construction whenever there is a change in construction or operations which may affect the potential discharge of pollutants to surface waters, ground waters, or a municipal separate storm sewer system (MS4). A BMP must be identified to address the potential discharge of each pollutant. The SWPPP is a 'living' document and therefore must be amended if site conditions vary from the initial planning/investigation, site storm water run-off violates any condition of the General Permit, or the general objective of reducing or eliminating pollutants in storm water discharges has not been achieved. If the RWQCB later determines that the discharger is in violation of the General Permit, the SWPPP shall be amended and implemented in a timely manner, but in no case more than 7 calendar days after notification by the RWQCB. All amendments shall be documented on a separate sheet with any necessary pen and ink changes to the original SWPPP that will refer to the amendments. All amendments shall be dated and signed by the discharger and the government. All amendments shall be directly attached to the original SWPPP. Government approval is required on all amendments except for schedule changes as described below.

A schedule to implement the erosion and sedimentation BMPs shall be generated by the discharger and attached to this SWPPP. Other BMPs (such as installing a concrete washout area) that are specified by the contract shall be included in the schedule. The discharger may change this schedule to suit the actual construction condition if there is no increased risk of a stormwater pollution discharge. The contract specifies a requirement to install erosion controls on all disturbed soil within 14 days after completion of any such activity. Government approval is not required on any changes to the construction schedule if this 14 day requirement is being met. Government approval is required if the 14 day requirement cannot be met.

It is the contractor's responsibility to guarantee implementation of the SWPPP and compliance with all regulations, including the General Permit. The Corps of Engineers will verify that the contractor meets these obligations and reserves the right to inspect any and all contractor's activities.

5. SOURCE IDENTIFICATION

A. PROJECT INFORMATION

Hamilton Army Airfield (HAAF) was constructed on reclaimed tidal mudflats by the Army Air Corps in 1932. From 1932 to 1994 the base was used for aircraft staging, maintenance, and training. Most of the impacts on the site were done while it was used for aircraft support activities.

Construction and Remediation activities at HAAF will primarily involve soil impacted by petroleum hydrocarbons, PNAs, pesticides, and metals. Additionally, varying levels of VOCs and/or PCBs may be encountered during remediation/construction activities.

Historical storm water monitoring has indicated that the storm water discharges at HAAF are not being impacted by significant quantities of pollutants from the various construction and remediation projects. A table showing historically monitored pollutants in storm water run-off can be found in Attachment 2. The contractor must be aware that the potential for pollution in storm water discharges increases dramatically if the erosion of contaminated soil is not managed properly.

The work performed under this contract will provide support for soil remediation and wetland restoration work. Soil Remediation will involve soil excavation, movement, stockpiling and disposal offsite. Additionally, some concrete revetment removal will be performed at the site.

Because construction site runoff may become polluted through contact with disturbed earth, site contamination, construction materials, waste materials, or vehicle leaks, this plan identifies potential pollution sources and prescribes site specific Best Management Practices to control pollution. The BMP's are designed to minimize pollution sources, reduce contact of storm water with on site pollutants, and/ or remove pollutants from that storm water before it leaves the site.

In addition to the BMP's, a storm water Sampling and Analysis Plan (SAP) will monitor the pollutants movement in storm water and ensure that the BMP's are operating satisfactorily. The Government will implement the SAP, but the contractor must inform the Government construction representative if a breach in the storm water pollution prevention measures occurs which has the potential of discharging sediments into nearby water bodies.

Attachment 3 provides Site Maps showing drainage patterns of the construction area. Figures 2-2 through 3-5 illustrate the drainage patterns. These figures include color coded areas where erosion and sedimentation controls are installed. In the case that black and white copies of the site maps are generated and the attached figures are not color

coded, the contractor shall use color markers to locate the location of the erosion and sedimentation BMPs.

B. POLLUTANT SOURCE

The soil classification of the construction or disturbed area is expected to be chemically inert soil with mainly low levels of pesticide contamination. .

Based on the soil classification, the pollutant sources are contaminated storm water run-off, high turbidity water, soil erosion and sedimentation associated with a typical soil excavation and grading construction project. The potential for pollutants entering into nearby water bodies decreases dramatically if adequate storm water BMP's and a Sampling and Analysis Plan (SAP) are implemented. The drainage patterns are illustrated on the attached maps. Other construction related pollutant sources are identified as potential toxic or non-toxic sources, which are covered in subparagraphs 5D & 5E.

C. Stormwater BMPs:

There are three major types of Stormwater BMPs:

(1) **Erosion control** BMPs as described in Section 6. These BMPs are also specified in the contract specification 01356A. Erosion control BMPs are designed to prevent the initial mobilization of soil particles during a potential rain event. (e.g. tackified straw, temporary vegetation, geotextile, etc)

(2) **Sedimentation control** BMPs as described in Section 8. These BMPs are also specified in the contract specification 01356A. Sedimentation control BMPs are designed to trap soil particles in the water assuming that mobilization of soil particles have already occurred. (e.g. fabric rolls, silt fences, etc)

(3) **Mandatory Housekeeping** BMPs as described in Section 14. This may require the need for a tire wash area, periodic cleaning of access roads to the site entrances and exits, additional protection of nearby storm drain inlets, and/or having a concrete washout area.

D. **General Site and Material Management** BMPs

In addition to the stormwater BMPs listed above, the discharger also has the primary responsibility to implement General Site and Material Management BMPs, which are related to material and equipment that are imported to the site.

These BMPs include the prevention of equipment leaks (lubrication, fuel, hydraulic fluid, and transmission fluid), properly storing imported material (both hazardous and non-hazardous) in a protected storage area with secondary containments, having a spill control plan, maintaining and inspecting portable toilets, and ensuring all waste

containers or dumpsters have covers. The SF RWQCB Field Manual for Erosion and Sedimentation Controls[1] has listed these types of BMPs in the "General Site and Material Management" section. The discharger is responsible for implementation of these BMPs and the on-site government field representative will inspect and note in the daily field report that the site is in compliance with adequate BMPs being deployed.

To document all material that is being imported to the site and identify the type of General Site and Material Management BMPs, the discharger must complete Section 5E and 5F. The discharge must also complete Section 9 to identify the Spill control plans, and any additional management practices utilized by the discharger.

5E. TOXIC MATERIAL INFORMATION

Generally, the use of any toxic material must be in compliance with federal, state, and local requirements. Cal-OSHA (Title 8, Section 5194) and EM 385-1-1 (USACE Safety and Health Requirements) is invoked on this project and this requires the contractor to develop a Written Hazard Communication Program. This program requires a list of any hazardous substances, provide the material safety data sheets (MSDS), and train all employees on their proper use and disposal, including a spill control procedure and any required personal protection measures. The disposal of any toxic waste must be in compliance with federal, state, and local requirement.

The discharger shall provide a description of any toxic material (lubrication oils, cleaning solvents, fertilizer, pesticides, portable toilet chemicals, slurry wall material, etc) that will be transported to the construction site and may potentially be affected by a stormwater event. The discharger shall identify the specific BMPs associated with each toxic material on how to contain the toxic material during a stormwater event. Examples of BMPs are as follows: (1) a waterproof cover or storage area, (2) identification of employee responsibilities before, during, after use of any toxic material in a potential stormwater event situation, (3) using or storing toxic material in an area where there is a natural or man-made secondary containment system, (4) an inventory system for tracking purposes and (5) an inspection by the SWPPP coordinator to verify that the construction workers have secured all toxic material at the end of the shift.

If the number of toxic materials is relatively small, the daily field logbook may serve as an inventory system to record and track the amount of toxic material being used. If using the field logbook is too cumbersome to track the use of each toxic material, then the discharger may develop a separate tracking system to verify that all toxic material is secured prior to a stormwater event. The identification of any toxic material that may be affected by a stormwater event and the applicable BMPs shall be identified below:

[1] This 9" by 9" Field Manual illustrating 34 BMPs on 126 color pages is available at http://www.swrcb.ca.gov/stormwtr/training.html for $25

Toxic Material	Quantity	Location Utilized	Storage Location
1._____	_____	_____	_____

BMPs: _____
_____
_____
_____
_____
_____

2._____	_____	_____	_____

BMPs: _____
_____
_____
_____
_____
_____

3._____	_____	_____	_____

BMPs: _____
_____
_____
_____
_____
_____

4._____	_____	_____	_____

BMPs: _____
_____
_____
_____
_____
_____

5_____	_____	_____	_____

BMPs: _____
_____
_____
_____
If necessary, attach additional sheets or attach a procedure addressing the BMPs.

5F NON-TOXIC MATERIAL INFORMATION

The discharger shall also describe any non-toxic construction material (i.e. sand, concrete, aggregate, soil amendments, washing soap, and wastewater, etc) and any equipment that may potentially cause a discharge of material into a receiving water.

Describe all non-toxic construction material that will come in contact with potential stormwater during this project:

_____
_____
_____
_____

Describe all commercial equipment and commercial vehicles that will come in contact with potential stormwater during this project:

_____
_____
_____

Describe all on-site equipment storage, cleaning and maintenance activities:

_____
_____
_____

Describe the disposal procedure of all excess construction material and equipment:

_____
_____
_____

Based on the above inventory, the discharger shall describe the BMPs on how to prevent stormwater pollution from any non-toxic material or associated activity. (examples of BMPs are ensuring certain material is stored in waterproof containers, minimizing the use of certain material exposed to potential rainfall, securing certain material for the evening or weekends, etc, having a map showing where the material and/or equipment is stored or utilized, inspecting all imported material, storing the material with secondary containments or away from drainage inlets). Note: See Section 14 for housekeeping BMPs to clean residential streets due to vehicles tracking mud from the construction site.

_____
_____
_____
_____
_____
_____
_____

G. SAMPLING AND ANALYSIS PLAN

To help limit the potential of soil contaminants impacting storm water discharges a storm water Sampling and Analysis Plan (SAP) is in effect. The SAP involves sampling of storm water discharges from the site and analyzing those samples for potential pollutants.

In the past a Contractor has obtained storm water discharge samples as guided by the Hamilton Storm Water Pollution Prevention Plan (March 1999). This plan resides in the Hamilton field office Administrative Record. At the onset of the winter rain season after this project is completed a Contractor to be selected shall obtain water samples in a manner consistent with the SWPPP during or immediately after three representative storm events (or during the period of active storm runoff) from three locations on the Hamilton airfield. Each of the three locations will be sampled for Metals (including Hg) (filtered and unfiltered), PAHs (filtered and unfiltered), field measured TSS, pH, turbidity, and temperature, TPH extractable (quantitated for JP-4, diesel, and motor oil),TPH purgeable (quantitated for gasoline) and Pesticides. Sample locations are at the Greystone outfall onto the BRAC property, at the New Hamilton Partners outfall onto the BRAC outboard drainage ditch.

The sampling of storm water by others may occur while this contract is in service. While sampling and analysis are not covered under this contract, the discharger is required to be aware and knowledgeable of sampling at the site. In addition, if there is a failure of storm water pollution prevention measures and there is a potential of sediments entering nearby water bodies, the discharger must inform the Government Construction representative immediately so that sampling can be performed and steps be taken to remedy the situation.

If required sampling may be done by Government or Contract workers under a modification or separate contract. NOTE: Samples will be sent to a USACE certified and California State Certified environmental laboratory employing approved EPA SW846 methods for preparation and analysis. The Contractor shall obtain standard two week (14 calendar day) turnaround analytical chemistry services, and will submit photocopies of all laboratory findings to the Corps Project Manager with courtesy copies supplied to the BEC at the Hamilton Field office within 48 hours of receipt of analysis reports from the Laboratory. The Contractor shall obtain results to reporting limits consistent with the Plan. Any deviations from the SWPPP or referenced documents from the SWPPP shall be reviewed and approved by the Corps Project Manager.

6. EROSION CONTROL

Erosion control, also referred to as “soil stabilization” is the most effective way to retain soil and sediment on the construction site. Erosion control is designed to prevent the initial mobilization of soil particles during a rain event. Since work may occur during the rainy season (October 1 to March 31), erosion control measures will minimally consist of fiber wattles and preserving, to the extent possible, existing vegetation. A silt fence, in

conjunction with the previous measures, is an alternative erosion and sediment control measure. Disturbed areas will be stabilized during construction by spraying water to control dust movement. If current conditions change due to site activities or a significant weather event, additional erosion control measures will be implemented by modification.

The discharger shall develop and attach a schedule to this SWPPP for implementation of the any erosion control measures undertaken by the discharger during the period of service of this contract. The schedule must meet the implementation requirements in the contract (Section 01356A). The schedule must include any information associated with the phased or segmented installation of erosion control measures to reflect their intended approach to overall project construction. Once project generated stockpiles have been removed and final site cleanup is completed, discharger's responsibility is finished. Site cleanup shall include removal of construction dirt / soil accumulated on hard surfaces (runway, taxiways, or roads) resulting from the contractor's construction activities.

7. STABILIZATION

The dischargers and the government shall verify the following stabilization requirements prior to submitting a Notice of Termination (NOT) at the end of the revegetation establishment period.

- All soil-disturbing activities by the discharger are completed. Once work is completed, the soil stockpiles have been removed, and the SWPPP has been implemented the discharger's responsibility ends.
- A uniform vegetative cover with 70 percent coverage has been established. The government is required to ensure that this requirement is met prior to sending the NOT.

If the 70 percent vegetative coverage has not been established by summer of the following year after construction, equivalent stabilization measures shall be employed as needed by the government. These equivalent stabilization measures include the use of BMPs such as blankets, reinforced channel liners, soil cement, fiber matrices, geotextiles or other erosion resistant soil coverage or treatment.

If the background native vegetation covers less than 100 percent of the surface, such as arid areas, or the bottom of drainage ditches, the 70 percent coverage criteria can be adjusted using the following calculation example: If the native vegetation covers only 50 percent of the ground surface, as an example, then 50 percent times the original 70 percent criteria = 35 percent as the "adjusted criteria". The vegetation on the disturbed area must cover 35 percent for the total uniform surface coverage in order to meet the acceptance criteria. To permit use of the adjusted criteria, the discharger must take sufficient photographs prior to the project to demonstrate that the native vegetation cover was less than 100 percent.

The above criteria shall be used during the walk-through or drive-through inspection described in section 2. If the stabilization inspection is acceptable, the government shall proceed to submit the Notice of Termination.

8. SEDIMENTATION CONTROL

Generally, sedimentation control BMPs shall consist of filtration and barrier devices along the downstream site perimeter and at all inlets to any storm water drain system. Sedimentation control assumes that the initial mobilization of soil particles has occurred during a rain event and therefore these BMPs are necessary to trap and prevent an adverse discharge into a protected body of water.

Until permanent vegetation is established, temporary sedimentation control BMPs must be installed as follows:

Fiber wattles, rock filters, and silt fences are the recommended forms of sedimentation control for this project. Listed below (and on the attached site maps) are areas that require sedimentation controls. The contractor must add additional sedimentation controls as dictated by site conditions.

(1) Down slope of site (construction, staging , and traffic areas).
(2) At the foot of slopes if bank protection isn't immediately in place.
(3) At the bottom of channels, perpendicular to flow.
(4) Where needed in drainage paths to limit the potential for sediment flow to the site discharge points.

The discharger shall develop and attach a schedule to this SWPPP for implementation of the above sedimentation control measures. The schedule must meet the implementation requirements in the contract (Section 01356A). The schedule must also include any information associated with the phased or segmented installation of erosion control measures to reflect their intended approach to overall project construction.

9. NON-STORM WATER MANAGEMENT

The non-storm water discharge management and the BMPs are as follows:

A. Accidental discharges. BMP: See Environmental Protection Plan
B. Discharge of construction worker wastewater BMP: See below.
C . _____
D. _____

A. The Environmental Protection Plan is required by contract specification Section 01430. Compliance to the Environmental Protection Plan is mandatory. The

Environmental Protection Plan should include notification to the government and to any applicable regulatory agencies.

B. The Discharge of construction worker wastewater (portable toilet water, office trailer wastewater, etc) must be in accordance with state laws and/or local ordinance

C & D are used to document any existing contractor's management plans used to manage material such as inventory control, employee awareness training plans, etc If none exists, record N/A.

10. POST CONSTRUCTION STORM WATER MANAGEMENT

The original plans and specification provide the revegetation, landscaping, and drainage structure requirements that are designed to reduce any stormwater pollutants in a post-construction discharge.

The Post-Construction Storm Water Management shall consist of the Government inspecting the site and then recording the plant installation, survival and mortality counts, identifying losses, and inspecting any erosion control BMPs that should be already invoked by the contract specification.

In addition to the vegetation inspection and record keeping specified by the contract specification, the discharger shall also inspect for any potential risk for storm water pollution. This inspection is separate and the discharger shall report this inspection using the same form used in Section 11. Government notification is required if any deficiency is discovered during this inspection. All requirements of the General Permit are still mandatory during the revegetation establishment period.

11. MAINTENANCE, INSPECTION, AND REPAIR DURING CONSTRUCTION

The SWPPP coordinator shall be responsible to inspect and maintain all BMPs identified in this SWPPP to ensure its effectiveness. During the rainy season (Oct 1 to April 14), the inspection shall be conducted twice a week, on every Monday and every Friday beginning with the start of soil disturbing activities. This inspection also requires that the SWPPP coordinator check and document the current weather forecast and 5 day weather forecast. The inspection must be documented using the inspection form that is provided on the next page. By completing this inspection form at least twice a week, this will ensure that the weather is being monitored and that the BMPs are being maintained.

In addition to the twice a week inspection, an inspection by the Government onsite worker must be performed "before", "during", and "after" a major rainfall or storm event during daylight hours. A major rainfall event will normally develop sufficient runoff water that will discharge at least 50 gallons into a storm drain or a body of water. If the

rainfall or storm event lasts more than 24 hours, then the inspections must also be performed every 24 hours "during" the rainfall or storm event. Two inspections in a single day is not necessary if the "before", "during" and "after" inspections also coincide with the normal Monday or Friday inspection. Safety is a high priority during a storm inspection and therefore inspection may be omitted if the inspection cannot be conducted safely. In this case, the inspection report should state: "No inspection due to unsafe inspection conditions: flooding, lighting, high wind, or engulfing mud" and a signature is required to document the unsafe condition. Inspection is only required once a week, every Friday, if construction is occurring during the non-rainy season.

The inspection must assess the BMP effectiveness and implement repairs or design changes as soon as possible depending on field conditions. If the BMPs are not effective, the BMPs must be upgraded to maintain compliance with the Permit and the SWPPP revised afterwards. The SWPPP coordinator shall ensure that equipment, materials, and workers are made available for rapid response to failures and emergencies that are necessary to prevent stormwater pollution. All completed inspection forms should be filed in a three ring binder and must be available when requested by the government or the RWQCB. After project completion, the three-ring binder and all completed inspection forms shall be submitted to the government for retention for a period of three years. Discharger shall provide a copy of the inspection forms as an appendix to the completion report.

In certain situations, the government may require by modification that the discharger conduct additional site inspections, submit reports, or perform sampling and analysis.

For a post construction inspection during the revegetation period, the words "Post-Construction" shall be entered in the block that is normally used to record "Monday or Friday". The Post Construction Inspection shall be conducted at least once a month for the 1st year of the revegetation. In addition to the above inspection cycle, the Government shall also conduct an inspection "before", "during" and "after" a major rain event in order to be in compliance with the General Permit during the post contraction period.

SITE INSPECTION/MAINTENANCE/REPAIR FORM - Required by SWPPP, SECTION 11
(reproduce this sheet and complete one sheet for each inspection. File the completed inspection record in a three ring binder.)

Date and Time of Inspection:
Weather Information during Inspection Date:
Weather Forecast (long range 5 day forecast):
If this is a rain event inspection, record "before", "during", or "after". For a non-rain event maintenance inspection, record "Monday" or "Friday" Inspection.
BMP Inspection Results (narrative description of all BMPs, inspection results, and/or description of any inadequate BMPs. If necessary, write on other side of this form). This must include observations of erosion controls, sediment controls, toxic and non-toxic BMPs and non-storm water controls.
Inspection Results of relevant outfalls, discharge points into the river or downstream agricultural ditch from the Disposal Site. (narrative description of water being discharged, if any)
If applicable, Corrective Action Taken and being Taken (including BMP maintenance activities, repairs, and any necessary changes to SWPPP and implementation dates)
SWPPP Coordinator conducting Inspection (Name, Signature, and Date)

12. TRAINING

The SWPPP coordinators identified in Section 13 must be appropriately trained and the training shall be documented in this section. Training shall include, as a minimum, at least one formal training class and/or workshop (one day minimum) offered by the SWRCB, RWQCB, EPA, a professional organization, or an academic college or university, on Storm Water Pollution Prevention Measures. An awareness video (Hold on to your dirt) and a Field Manual by the SF RWQCB is available at the Resident Office or Sacramento District technical library but this is considered "interim training" until the formal training is scheduled and completed by the contractor while the project is in progress.

Training classes and completion date attended by the Primary SWPPP coordinator:

_____

_____

Training classes and completion date attended by the Secondary SWPPP coordinator:

_____

_____

13. LIST OF ON-SITE SWPPP COORDINATOR(s)

The discharger shall designate a Primary SWPPP coordinator who has the authority and primary responsibility to implement the requirements of this SWPPP. A Secondary SWPPP coordinator shall also be identified who will assume the SWPPP coordinator's responsibilities in the event the Primary SWPPP coordinator is not on-site. Either the Primary or Secondary SWPPP coordinator must be on-site during normal construction hours. The Primary and Secondary SWPPP coordinator shall have a cellular phone during normal working hours and have an evening or after hours phone number. The SWPPP coordinator shall be responsible to monitor the weather, including long range forecast and weekend forecast, and have the authority to mobilize construction workers to implement the BMPs identified in this SWPPP. The names of the Primary and Secondary SWPPP Coordinator shall be recorded here:

Primary SWPPP Coordinator Name:_____

Primary SWPPP Coordinator Duty Cell Phone: _____

Primary SWPPP Coordinator After Hours Phone: _____

Secondary SWPPP Coordinator Name:_____

Secondary SWPPP Coordinator Duty Cell Phone: _____

Secondary SWPPP Coordinator After Hours Phone: _____

The SWPPP coordinator shall be responsible to ensure full implementation of this SWPPP. This also includes briefing the government, the public or a RWQCB representative on any details of maintaining compliance with the General Permit and this SWPPP. If a regulatory agency inspector visits the site for compliance unannounced, the SWPPP coordinator must notify the government immediately and then cooperate with the inspector during the inspection. Any deficiencies must be corrected and reported to the government.

Other responsibilities shall include briefing any subcontractor, suppliers, vendors and visitors. The SWPPP coordinator shall ensure all subcontractors and all other personnel are aware of the requirements of this SWPPP and any work conducted by the subcontractor and all other personnel must not affect any of the BMP designed to eliminate Storm Water Pollution.

14. OTHER PLANS

Prior to SWPPP certification, an initial schedule for BMP implementation shall be generated by the discharger and attached to this SWPPP. This schedule shall include all scheduled training, schedule to install all erosion and sedimentation BMPs, mandatory housekeeping BMPs (described below), toxic and non-toxic material BMPs, erosion control BMPs, and completion of the maintenance/inspection/repair forms. An initial schedule must be attached to this SWPPP prior to government approval. The discharger is responsible to update this schedule to suit actual site conditions. If the changes are frequent, the discharger may consider using a computer program on a laptop to identify the initial schedule and then make the changes when necessary. A current, updated schedule must be made available when requested by the government or the RWQCB.

15. PUBLIC ACCESS

As described in Section 3, this SWPPP must be made available to the public under Section 308(b) of the Clean Water Act.

16. SWPPP CERTIFICATION

Discharger Certification of the Final SWPPP: A Main Construction Contractor's principle executive officer, responsible corporate officer, general partner or proprietor, or owner[2] must also sign and certify the SWPPP. The on-site Primary SWPPP coordinator and Secondary SWPPP coordinator are also required to sign and certify the SWPPP.

Prior to Certification, all blanks shall be completed per Section 2 and a schedule for BMP implementation shall be generated by the discharger and attached to this SWPPP as Attachment 3. The discharger is also responsible to revise and update this SWPPP and the attached time schedule when changes occur.

"I certify under the penalty of law that this document and all attachments were verified to be applicable to this construction project to the best of my knowledge and that compliance with the SWPPP and the General Permit requirements are mandatory. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I also understand that I must give notice to the government, the RWQCB, and any local storm water management agency of any planned changes in the construction activity, which may result in noncompliance with the SWPPP or the General Permit requirements. I have also read, understand, and intend to comply with all provisions of the General Permit (Attachment 1) and I also understand that I am responsible for recognizing any changes in the project, which may affect this SWPPP and the requirements of the General Permit."

CERTIFICATION SIGNATURE_____DATE_____

PRINT NAME_____

PRIMARY SWPPP COORD. SIGNATURE_____DATE_____

PRINT NAME_____

SECOND. SWPPP COORD. SIGNATURE_____DATE_____

PRINT NAME_____

After certification, the discharger shall submit this SWPPP for government review and approval below:

GOVERNMENT APPROVAL _____ DATE_____

GOVERNMENT AGENCY: US Army Corps of Engineers

[2] A duly authorized representative may also signed the certification statement provided the authorization is in writing by the principle executive officer, responsible corporate officer, general partner and proprietor, or owner and the written delegation is attached to this SWPPP.

17. ANNUAL CERTIFICATION AND NONCOMPLIANCE REPORTING

The government shall complete the annual certification requirement that all construction activities are in compliance with the requirements of this SWPPP and the General Permit. This Annual Certification is also based on the completed site inspection forms per Section 11 of this SWPPP and is normally completed by July 1 of each year.

Prior to the government completing the annual certification to the state board, the Primary SWPPP coordinator is required to provide a memorandum of record to the government that will support the annual certification. This memorandum shall read as follows:

"I certify under the penalty of law that this construction project is in compliance with the SWPPP and the General Permit requirements to the best of my knowledge. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

If there is a discovery of noncompliance and/or the annual certification statement or the memorandum of record cannot be completed due to non-compliance, a letter must be sent to the RWQCB with a copy to the government reporting the details of the non-compliance within 30 days upon discovery. This letter must also describe any corrective action measures taken, assessment of any potential damage or increased risk to stormwater pollution, actions necessary to achieve compliance and a time schedule indicating when compliance will be restored. The time schedule is subject to modification by the RWQCB.

18. ATTACHMENTS

ATTACHMENT 1 - GENERAL PERMIT*
(To be attached prior to award of contract)

ATTACHMENT 2 –LIST OF HISTORICALLY MONITORED POLLUTANTS

ATTACHMENT 3 - SITE MAPS. Figures showing Project Drainage Pattern and BMPs
(To be attached prior to award of contract)

ATTACHMENT 4 - CONTRACTOR's SCHEDULE TO IMPLEMENT BMPs
(To be attached by the contractor prior to government approval)

ATTACHMENT 5 – COMPUTATION SHEET FOR DETERMINING RUNOFF COEFFICIENTS

ATTACHMENT 6 - COMPUTATIONAL SHEET FOR DETERMINING RUN-ON DISCHARGES

ATTACHMENT 1

GENERAL PERMIT *

* THE CURRENT GENERAL PERMIT may be downloaded from the State Water Resource Control Board homepage at www.swrcb.ca.gov and clicking “stormwater” and then clicking “construction program.”

ATTACHMENT 2

LIST OF HISTORICALLY MONITORED POLLUTANTS

TABLE 1. LIST OF HISTORICALLY MONITORED POLLUTANTS

Analyte	Units
pH	pH Units
Turbidity	NTU
Gasoline	ug/L
JP-4	ug/L
Diesel	mg/L
Motor Oil	mg/L
Mercury (total)	ug/L
Antimony (total)	ug/L
Arsenic (total)	ug/L
Barium (total)	ug/L
Beryllium (total)	ug/L
Cadmium (total)	ug/L
Chromium (total)	ug/L
Cobalt (total)	ug/L
Copper (total)	ug/L
Lead (total)	ug/L
Molybdenum (total)	ug/L
Nickel (total)	ug/L
Selenium (total)	ug/L
Silver (total)	ug/L
Thallium (total)	ug/L
Vanadium (total)	ug/L
Zinc (total)	ug/L
Mercury (dissolved)	ug/L
Antimony (dissolved)	ug/L
Arsenic (dissolved)	ug/L
Barium (dissolved)	ug/L
Beryllium (dissolved)	ug/L
Cadmium (dissolved)	ug/L
Chromium (dissolved)	ug/L
Cobalt (dissolved)	ug/L
Copper (dissolved)	ug/L
Lead (dissolved)	ug/L
Molybdenum (dissolved)	ug/L
Nickel (dissolved)	ug/L
Selenium (dissolved)	ug/L
Silver (dissolved)	ug/L
Thallium (dissolved)	ug/L
Vanadium (dissolved)	ug/L
Zinc (dissolved)	ug/L
2-Methylnaphthalene	ug/L
Acenaphthene	ug/L
Acenaphthylene	ug/L
Anthracene	ug/L
Benzo(a)anthracene	ug/L
Benzo(b)fluoranthene	ug/L
Benzo(k)fluoranthene	ug/L
Benzo(g,h,i)perylene	ug/L
Benzo(a)pyrene	ug/L
Chrysene	ug/L
Dibenz(a,h)anthracene	ug/L
Fluoranthene	ug/L
Fluorene	ug/L
Indeno(1,2,3-cd)pyrene	ug/L
Naphthalene	ug/L
Phenanthrene	ug/L
Pyrene	ug/L
Total Suspended Solids	mg/L
Total Dissolved Solids	mg/L

Notes:
NTU Nephelometric Turbidity Units
NA Not Applicable
mg/L milligrams per liter
ug/L micrograms per liter

ATTACHMENT 3

Site maps

Showing

Drainage patterns and Storm Water Best Management Practices.

Figure 1: Vicinity Map -- Former Hamilton Army Airfield near Novato, California.

US Army Corps of Engineers
Sacramento District
Feb. 2004

3/5/2004 10:56:30 AM Hamilton_NOI\Figure2.mxd

Figure 2:. Former Hanilton Army Airfield Stormwater Plan and Revetment Removal and Coastal Salt Marsh Remediation Areas.

Perimeter Drainage Ditch Sampling Area

400 200 0 400 Feet

South of the Runway DDT Hotspot

14
19
13
21
22
26
25
4
3
2
1

Testing Range

Skeet Range

Legend

- Revetments to be removed
- Stormwater excavation areas

Coastal Salt Marsh Remediation Areas

Antenna Debris Disposal Area

Former Sewage Treatment Plant Outfall

East Levee Construction Debris Disposal and Burn Pit

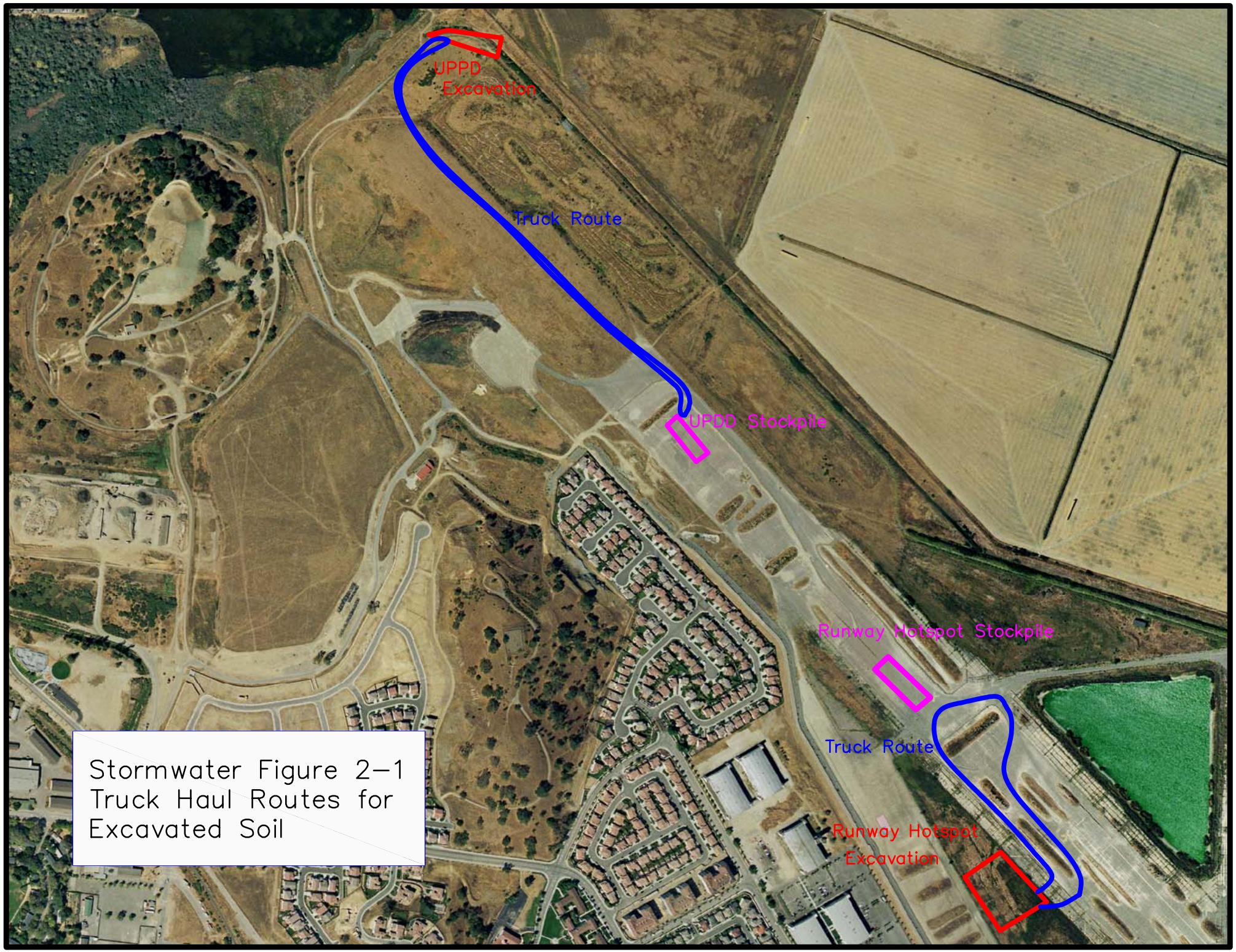
East Levee Construction Debris Disposal

Historic Outfall Drainage Ditch

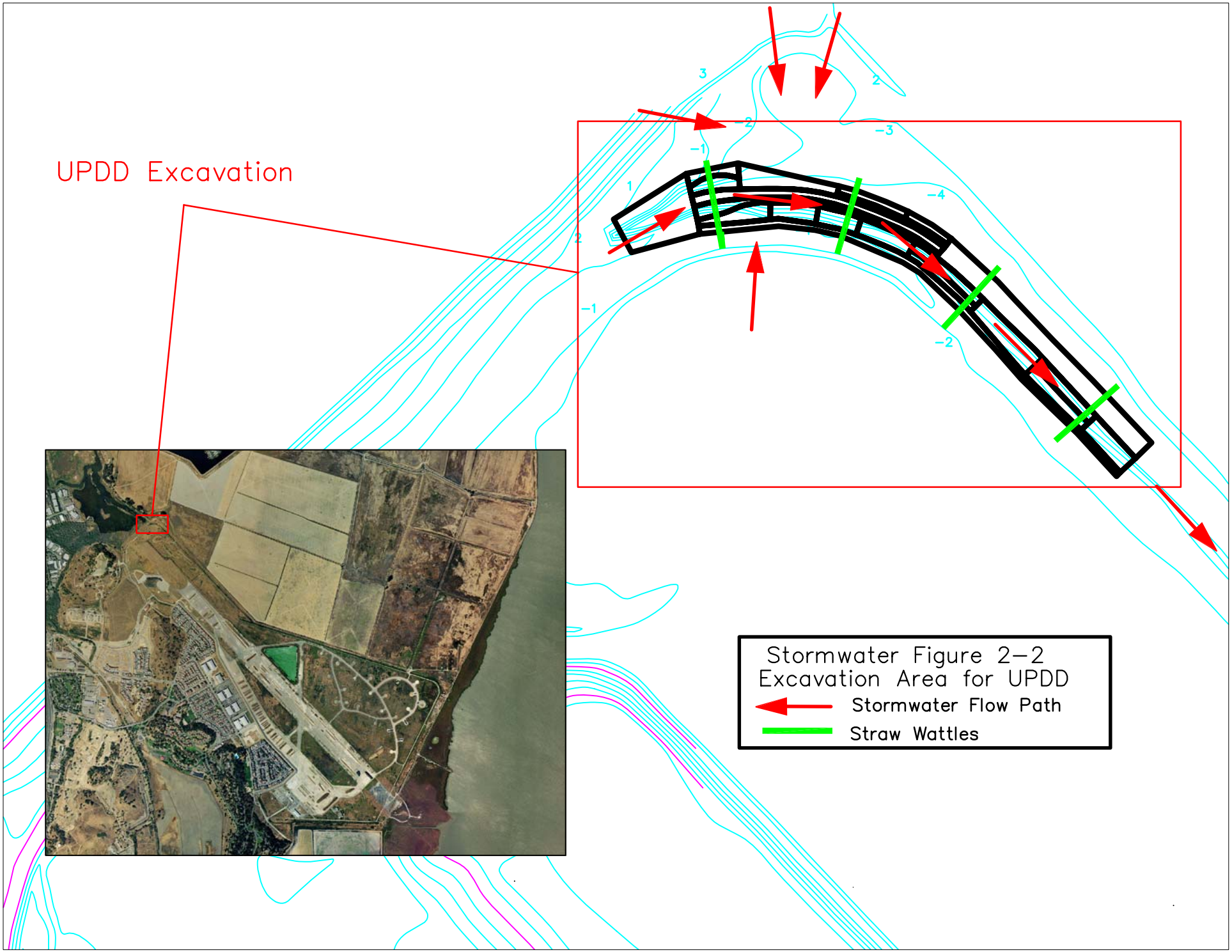
Boat Dock Channel Area

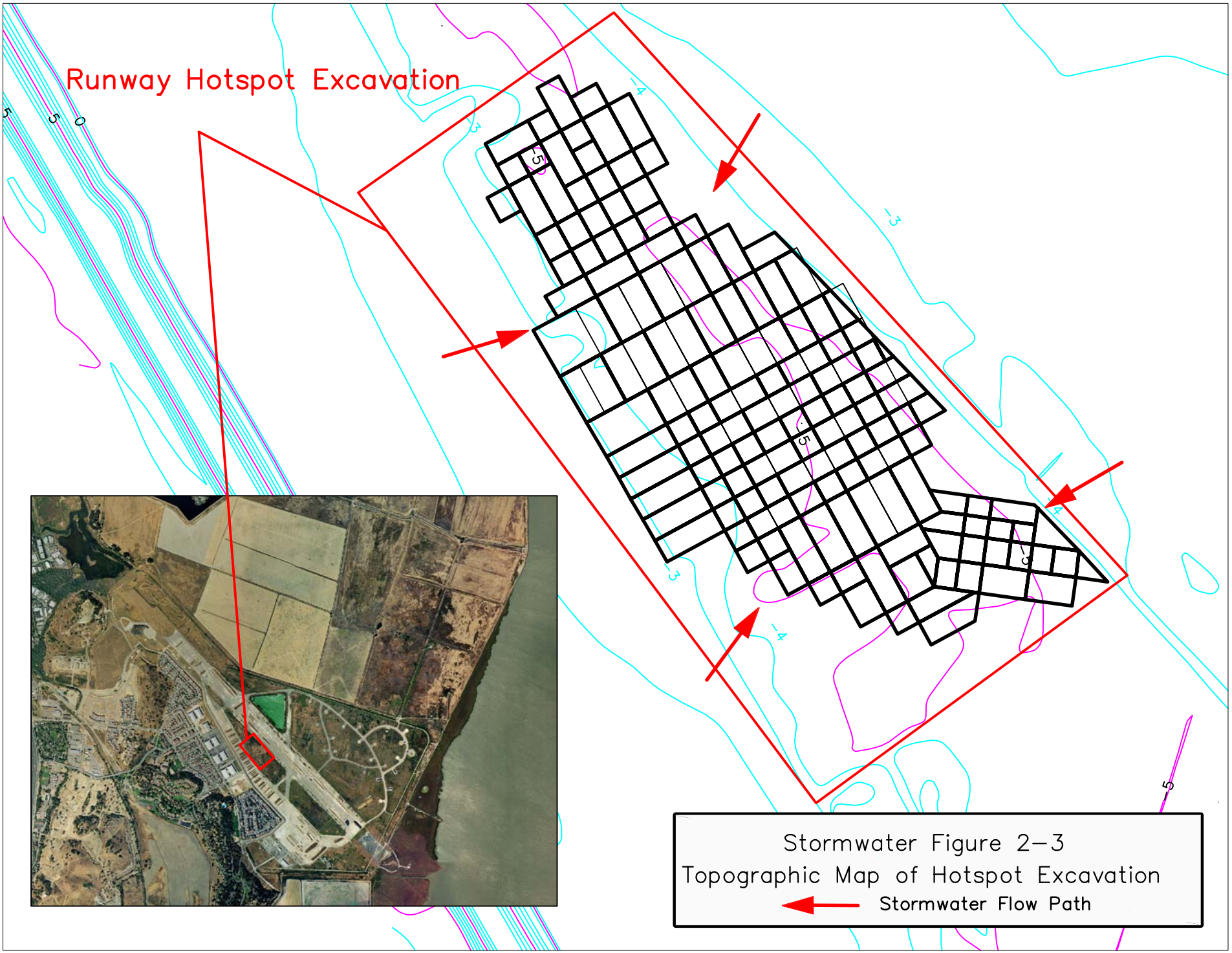
Boat Dock Nonchannel Area

400 200 0 400 Feet

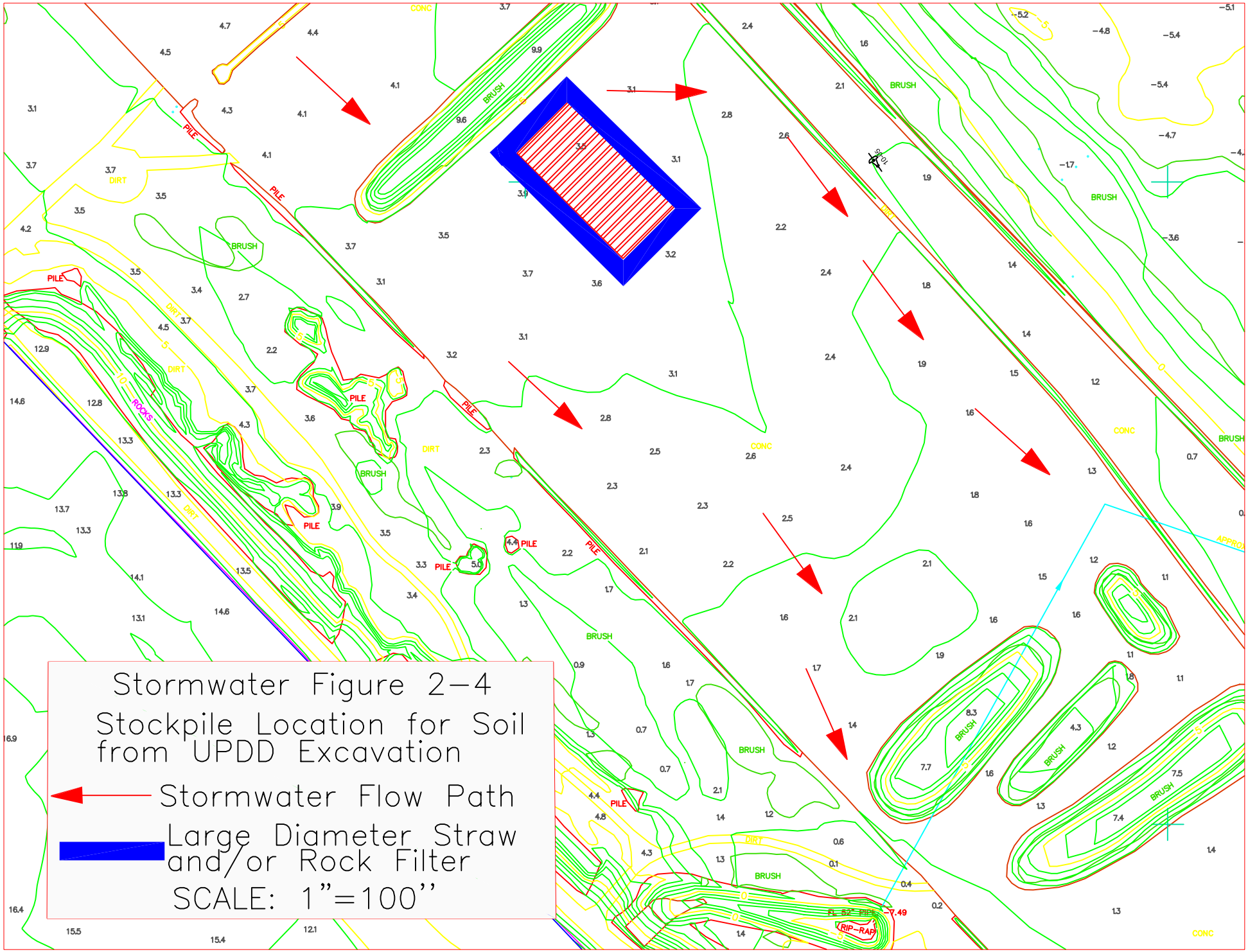


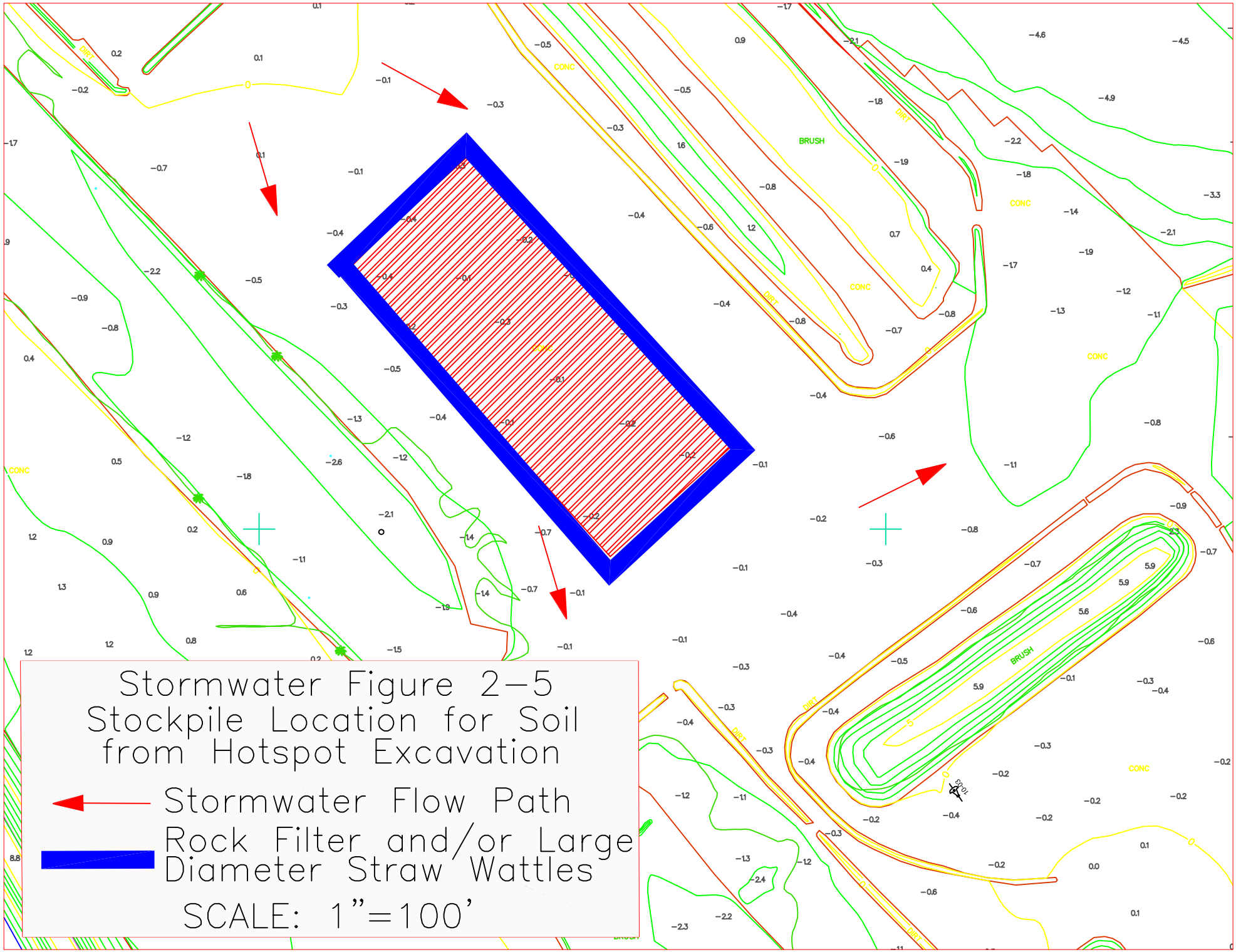
Stormwater Figure 2–1
Truck Haul Routes for
Excavated Soil


UPDD Excavation
3
2
-2
-3
-1
1
-4
2
-1
-2
Stormwater Figure 2-2
Excavation Area for UPDD
Stormwater Flow Path
Straw Wattles



Stormwater Figure 2–3
Topographic Map of Hotspot Excavation
Stormwater Flow Path


Stormwater Figure 2–4
Stockpile Location for Soil from UPDD Excavation
Stormwater Flow Path
Large Diameter Straw and/or Rock Filter
SCALE: 1"=100'
PILE
BRUSH
DIRT
ROCKS
CONC
RIP-RAP



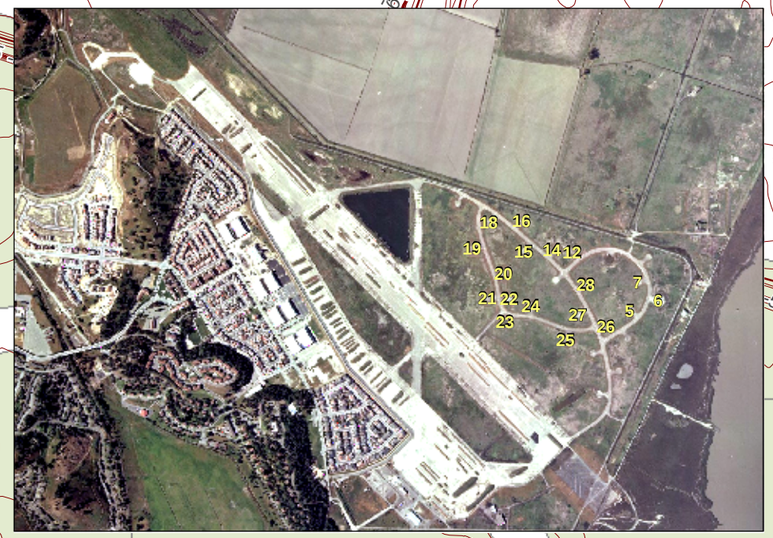
Stormwater Figure 2–5
Stockpile Location for Soil from Hotspot Excavation

Stormwater Flow Path

Rock Filter and/or Large Diameter Straw Wattles

SCALE: 1”=100’

Figure 3: Storm Water Drainage



Legend

- Straw wattle
- Storm water flow path
- Wetland Restoration Grid

200 100 0 200 Feet

(July/04O-E:\Wegenka) :\DATA\AOI_HAMILTON_AAF_SP83-CA3ftGIS-Projects-NAD83FT-SP3\Hamilton_BRAC\Hamilton_SW3P\Version2_Revetment_Figs\Fig3-Revetment_Overview.mxd

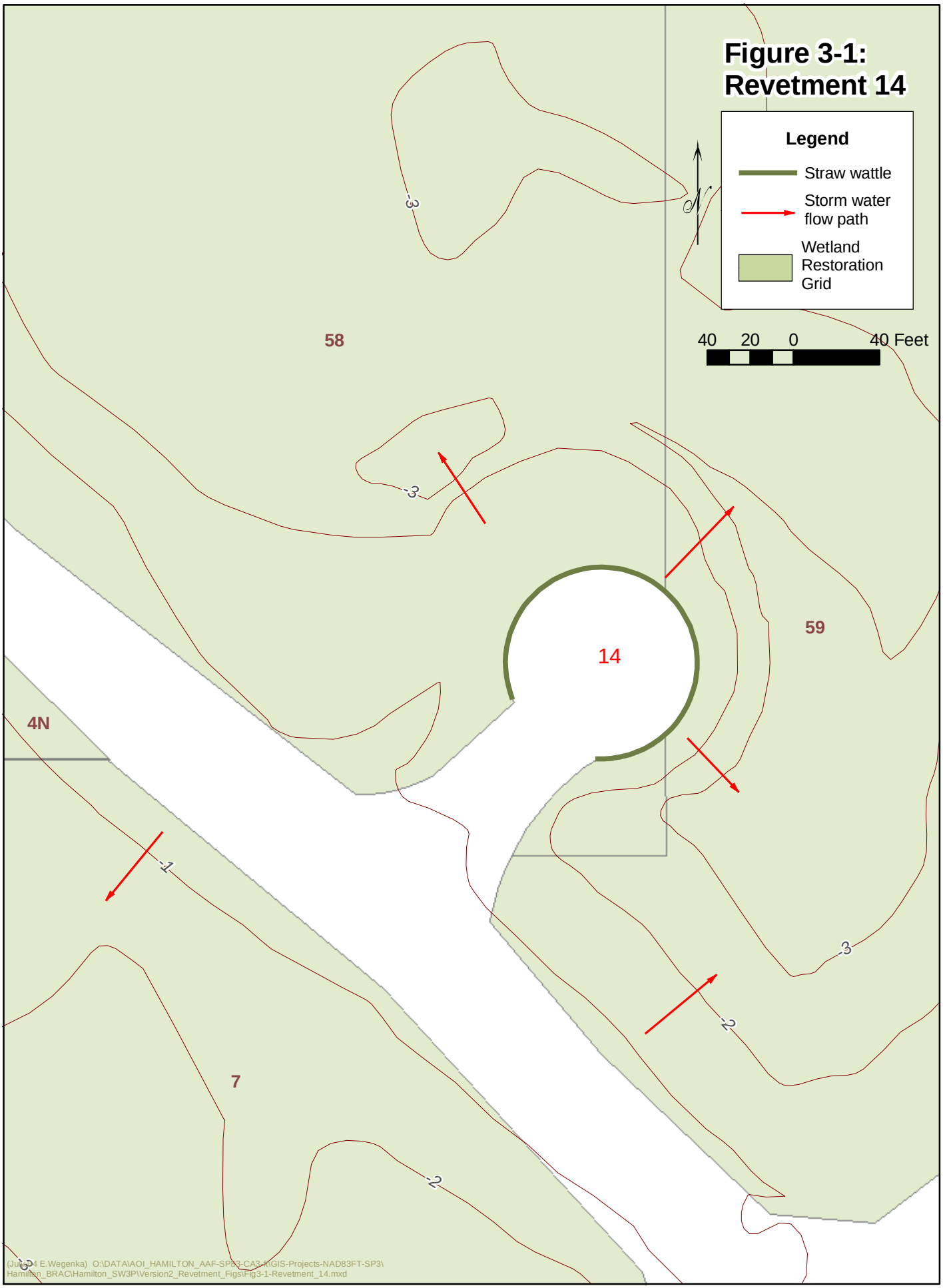


Figure 3-1:
Revetment 14
Legend
Straw wattle
Storm water flow path
Wetland Restoration Grid
N
40 20 0 40 Feet
58
59
14
4N
7
-3
-3
-1
-3
-2
-2
-3
(Jul 2014 E.Wegenka) O:\DATA\AOI_HAMILTON_AAF-SP83-CA3-N\GIS-Projects-NAD83FT-SP3\
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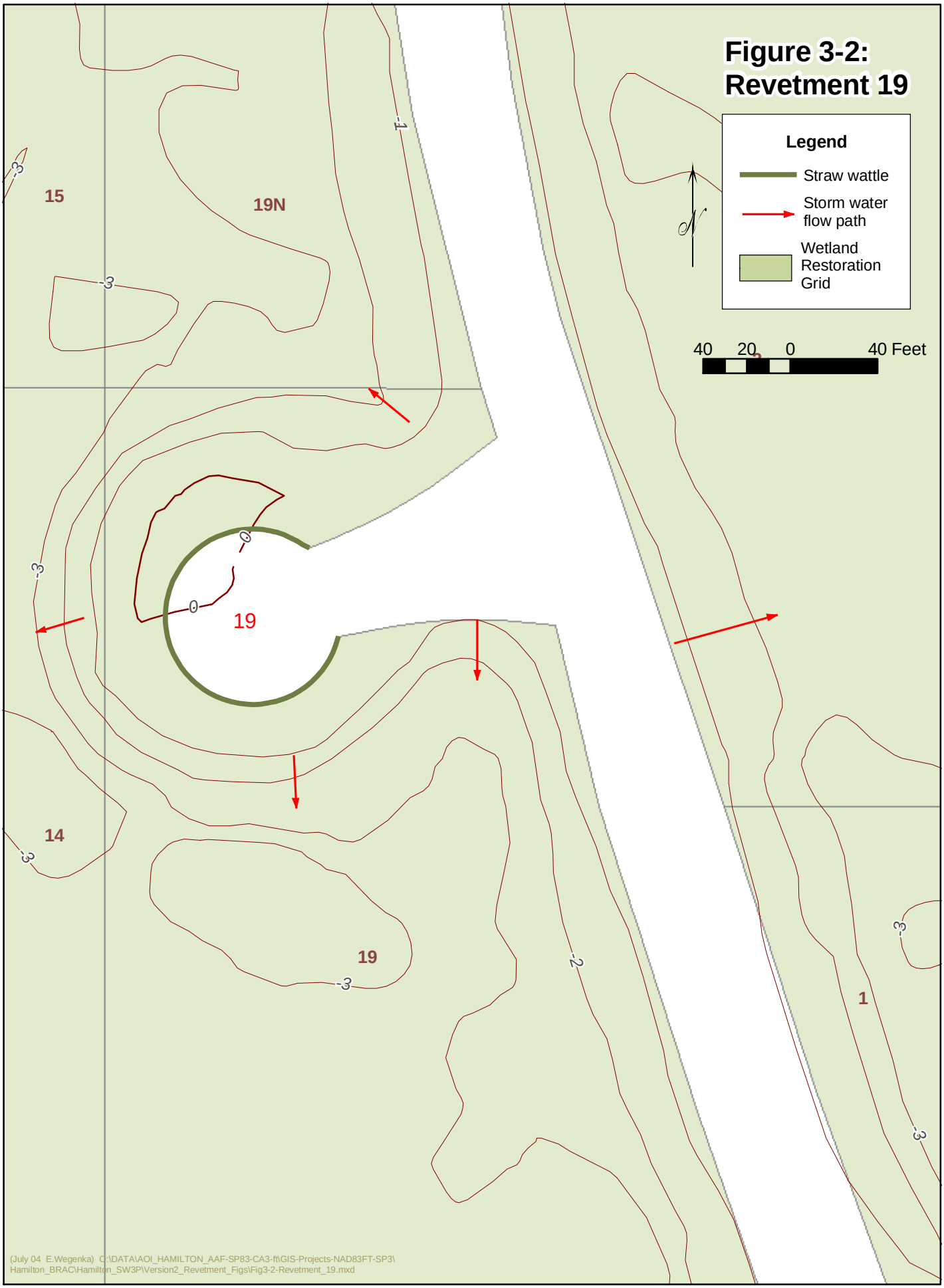
Figure 3-2:
Revetment 19
Legend
Straw wattle
Storm water flow path
Wetland Restoration Grid
N
40 20 0 40 Feet
15
19N
19
14
19
1
-3
-1
0
-2
(July 04 E.Wegenka) C:\DATA\AOI_HAMILTON_AAF-SP83-CA3-ft\GIS-Projects-NAD83FT-SP3\Hamilton_BRAC\Hamilton_SW3P\Version2_Revetment_Figs\Fig3-2-Revetment_19.mxd

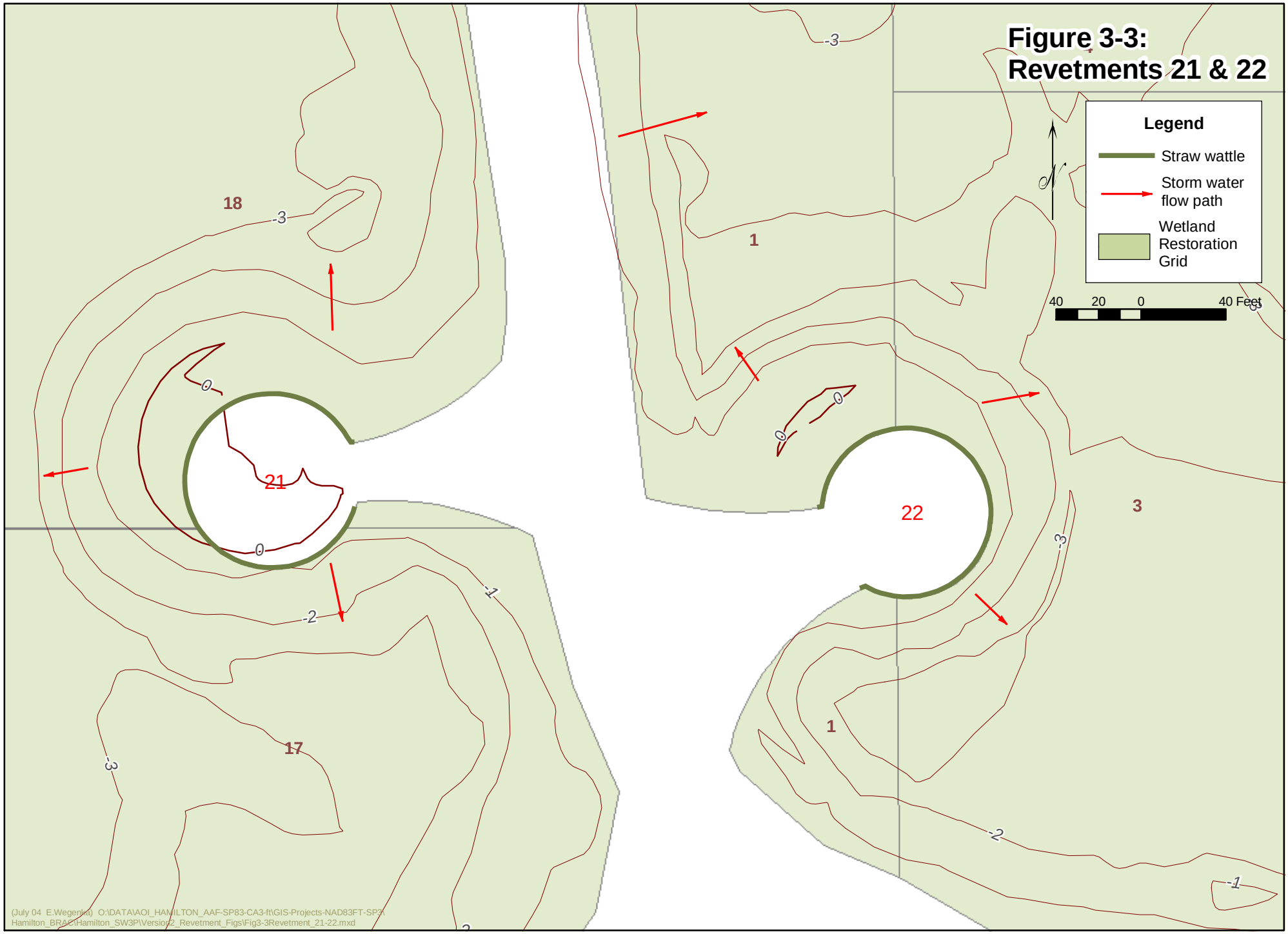
Figure 3-3:
Revetments 21 & 22
Legend
Straw wattle
Storm water flow path
Wetland Restoration Grid
40 20 0 40 Feet
18
1
21
22
3
17
1
-3
-2
-1
0
(July 04 E.Wegenka) O:\DATA\AOI_HAMILTON_AAF-SP83-CA3-ft\GIS-Projects-NAD83FT-SP3\Hamilton_BRAC\Hamilton_SW3P\Version2_Revetment_Figs\Fig3-3Revetment_21-22.mxd

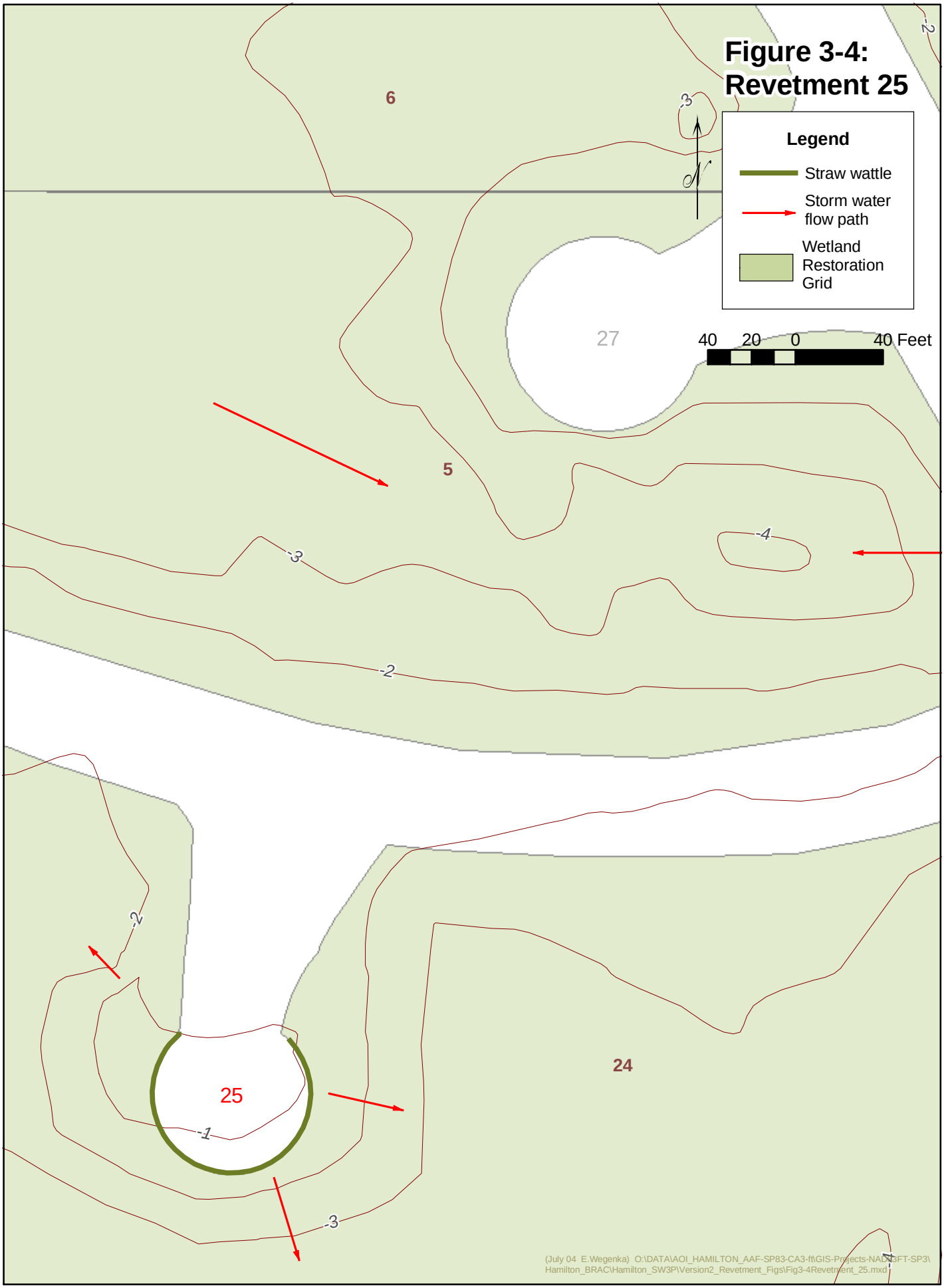
Figure 3-4:
Revetment 25
Legend
Straw wattle
Storm water flow path
Wetland Restoration Grid
N
40 20 0 40 Feet
6
5
27
24
25
-1
-2
-3
-4
(July 04 E.Wegenka) O:\DATA\AOI_HAMILTON_AAF-SP83-CA3-ft\GIS-Projects-NAD83FT-SP3\Hamilton_BRAC\Hamilton_SW3P\Version2_Revetment_Figs\Fig3-4Revetment_25.mxd

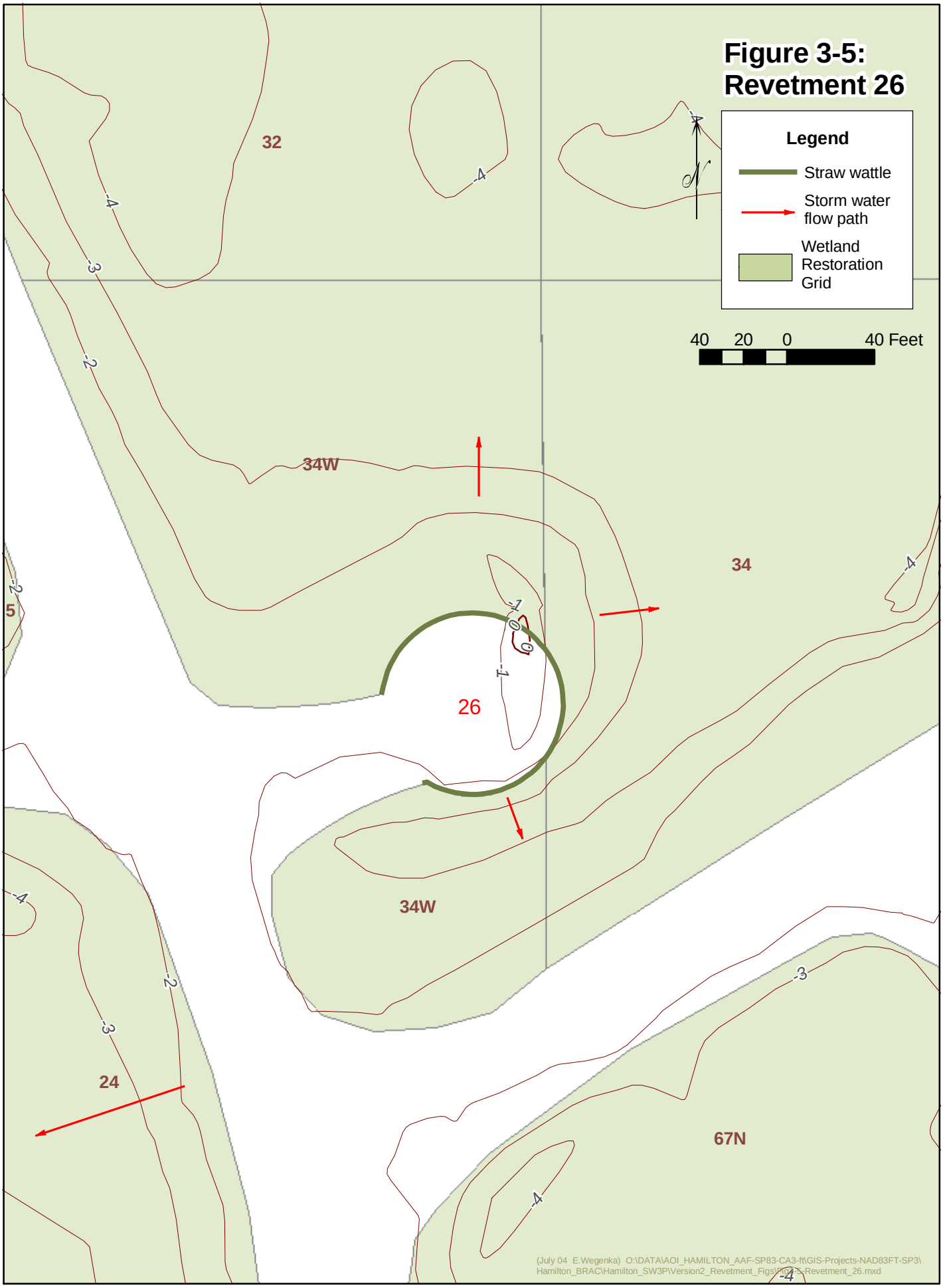
Figure 3-5:
Revetment 26
Legend
Straw wattle
Storm water flow path
Wetland Restoration Grid
40 20 0 40 Feet
N
32
34W
34
5
26
34W
24
67N
-4
-3
-2
-1
-0
(July 04 E.Wegenka) O:\DATA\AOI_HAMILTON_AAF-SP83-CA3-ft\GIS-Projects-NAD83FT-SP3\Hamilton_BRAC\Hamilton_SW3P\Version2_Revetment_Figs\Fig3-5-Revetment_26.mxd

ATTACHMENT 4

CONTRACTOR'S

SCHEDULE

TO INSTALL

BMP'S

ATTACHMENT 5

COMPUTATION SHEET FOR DETERMINING RUNOFF COEFFICIENTS

Attachment 5

Computation Sheet for Determining Runoff Coefficients

Total Site Area = 20.0 Acres (A)

Existing Site Conditions

Impervious Site Area [1]	=	6 Acres	(B)
Impervious Site Area Runoff Coefficient [2, 4]	=	0.95	(C)
Pervious Site Area [3]	=	14 Acres	(D)
Pervious Site Area Runoff Coefficient [4]	=	0.40	(E)
Existing Site Area Runoff Coefficient $\frac{(B \times C) + (D \times E)}{(A)}$	=	0.57	(F)

Proposed Site Conditions (after construction)

Impervious Site Area [1]	=	2 Acres	(G)
Impervious Site Area Runoff Coefficient [2, 4]	=	0.95	(H)
Pervious Site Area [3]	=	18 Acres	(I)
Pervious Site Area Runoff Coefficient [4]	=	0.40	(J)
Proposed Site Area Runoff Coefficient $\frac{(G \times H) + (I \times J)}{(A)}$	=	0.46	(K)

1. Includes paved areas, areas covered by buildings, and other impervious surfaces.
2. Use 0.95 unless lower or higher runoff coefficient can be verified.
3. Includes areas of vegetation, most unpaved or uncovered soil surfaces, and other pervious areas.
4. Refer to local Hydrology Manual for typical C values.

ATTACHMENT 6

COMPUTATIONAL SHEET FOR DETERMINING RUN-ON DISCHARGES

Attachment 6

Computational Sheet for Determining Run-on Discharges

Existing Site Conditions

Area Runoff Coefficient	=	0.57	(A)
Area Rainfall Intensity	=	0.45 in/hr	(B)
Drainage Area	=	20 Acres	(C)
Site Area Run-on Discharge (A) x (B) x (C)	=	5.13 ft^3/sec	(D)

APPENDIX B

FIELD SAMPLING PLAN (FSP)/ QUALITY ASSURANCE PROJECT PLAN (QAPP)

Hamilton Army Airfield
Marin Airfield Inboard Sites
Excavate Unlined Perimeter Drainage Ditch
Excavate South of the Runway DDT Hotspot
Demolish Revetments

REMEDIAL ACTION
FOR
HAMILTON ARMY AIRFIELD
NOVATO, CALIFORNIA

Prepared by:
SACRAMENTO USACE

August 2004

TABLE OF CONTENTS

ATTACHMENTS

ACRONYMS

BRAC	Base Realignment and Closure
COC	Chain of Custody
DDD	4,4'-Dichlorodiphenyldichloroethylene
DDE	4,4'-Dichlorodiphenyldichloroethane
DDT	4,4'- Dichlorodiphenyltrichloroethane
DoD	Department of Defense
DQO	Data Quality Objective
EDS	Environmental Design Section
EPA	Environmental Protection Agency
FSP	Field Sampling Plan
GC	Gas Chromatograph
HAAF	Hamilton Army Airfield
IDW	Investigation-derived waste
LCS	Laboratory Control Sample
MDL	Method Detection Limit
mg/kg	milligram/kilogram
PE	Performance Evaluation Sample
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
QL	Quantitation Limit
QSM	Quality Systems Manual
ROD/RAP	Record of Decision/Remedial Action Plan
SOP	Standard Operating Procedure
SFBRWQCB	San Francisco Bay Area Regional Water Quality Control Board
SRW	South of the Runway DDT Hotspot Site
UPDD	Unlined Perimeter Drainage Ditch Site
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
WP	Work Plan

1.0 INTRODUCTION

This Field Sampling Plan (FSP)/Quality Assurance Project Plan (QAPP) presents the project scope, regulatory authorities, project objectives, sampling procedures, and quality control requirements for the Soil Confirmation Samples for the document: *Work Plan - Remedial Action - Excavate Unlined Perimeter Drainage Ditch, Excavate South of the Runway DDT Hotspot, Demolish Revetments - Hamilton Army Airfield Main Airfield Inboard Sites* (hereafter referred to as the "WP").

1.1 Scope of Work

The soil confirmation sampling at the Unlined Perimeter Drainage Ditch (UPDD) and the South of the Runway DDT Hotspot (SRW) excavation sites is designed to collect the data necessary to ensure the removal of soils with concentrations of Total DDTs (defined as the total of 4,4'- Dichlorodiphenyltrichloroethane (DDT), 4,4'-Dichlorodiphenyldichloroethylene (DDD) and 4,4'-Dichlorodiphenyldichloroethane (DDE)) greater than 1 mg/kg. The US Army Corps of Engineers (USACE), Sacramento District will perform the sampling and field analysis.

1.2 Regulatory Authorities

The San Francisco Bay Area Regional Water Quality Control Board (RWQCB) shall administer primary regulatory oversight. The WP and final report for all activities shall be provided to the RWQCB for review.

1.3 Chemicals of Concern

The chemicals of concern for this sampling are Total DDTs. Soil with Total DDTs concentrations in excess of 1 mg/kg must be excavated and disposed of off-site.

1.4 Sampling Objectives

To achieve the objective of removing contaminated soils (at DDT levels that are above established action goals) and to advance the environmental closure of the HAAF Inboard Area, soil remaining on the property may not contain greater than 1 mg/kg Total DDTs in accordance with the *Main Airfield Parcel Record of Decision/Remedial Action Plan* (ROD/RAP) (Army, DTSC, RWQCB 2003). The objective of this confirmation sampling is to validate the removal of soil with known or suspected DDT concentrations in excess of 1 mg/kg and to quantify any remaining concentrations of Total DDTs at the UPDD and SRW sites.

1.5 Project Staffing

The Environmental Design Section (EDS), Sacramento District, USACE, under the supervision of Richard Meagher, Professional Engineer, California License Number 44858, prepared this FSP/QAPP, and will perform the fieldwork and write the report. Key project contacts are:

Person	Responsibility
Raymond Zimny	Project Manager
Kathy Siebenmann	Design Lead/Chemist
James Stellmach	Engineer, Field Sampler

1.6 Proposed Project Schedule

Confirmation sampling will be conducted following excavation of DDT-contaminated soil. As stated in the WP, a detailed project schedule will be prepared by the contractor and will be updated on a weekly basis once work begins. If confirmation sampling indicates additional soil removal, the additional excavation will be negotiated, and integrated into the ongoing project schedule. Excavation of additional material, above the initially estimated quantity, shall occur only as directed by the Contracting Officer.

2.0 DATA QUALITY OBJECTIVES

To generate data that will meet the project objectives, it is necessary to define the decisions that will be made, identify the intended use of the data, and design a data collection program. Data Quality Objectives (DQOs) are an integrated set of thought processes that define data quality requirements based on the intended use of the data. This includes any type of information utilized to form the sampling strategy or achieve the objective, not just analytical data. The DQO process will assist in determining the appropriate sampling design, detection and quantitation limits, analytical methods, and sample handling procedures.

The objective is to ensure that the soil at the SRW and UPDD sites with Total DDTs concentrations greater than 1 mg/kg is excavated for off site disposal and to quantify the level of any remaining DDTs. The DQOs for these objectives are presented below.

State the Problem

Through previous sampling events at the SRW and UPDD sites within the Inboard Area at HAAF, locations of DDT contamination (with Total DDTs concentrations greater than 1 mg/kg) have been identified. In this sampling effort, data will be produced that verifies the removal of those soils that were previously identified, in accordance with the BRAC ROD/RAP (Army, DTSC, SFRWQCB 2003) and will also quantify the level of any remaining DDTs.

Identify the Decision

The decision is to confirm that all soil at the Inboard Area SRW and UPPD sites containing greater than 1 mg/kg Total DDTs has been excavated for off-site disposal.

Identify the Inputs to the Decision

The following information will be used to make the decision regarding confirmation sampling.

Information Required	Location of Information	Activity to Provide Information
Soil removal criteria	HAAF Final ROD/RAP (Army, DTSC, RWQCB 2003)	None
Total DDTs data from each previously delineated sampling grid and areas.	USACE Technical Memorandum of Pre-remedial Sampling (to be published)	None

Information Required	Location of Information	Activity to Provide Information
Total DDTs results from the boundary of excavated soil	To be collected during this field effort	Sampling and analysis of soil (from the walls and floors of excavations) for Total DDTs

Define the Boundaries

Spatial Boundaries: The physical boundary of the sampling area is the area of the soils exposed upon excavation, as indicated in the WP (those grids with greater than 1 mg/kg Total DDTs, as indicated).

Temporal Boundaries: Excavation of affected soils will take place as funding allows.

Develop a Decision Rule

After excavation, if the Total DDTs concentration from remaining soils is greater than 1 mg/kg, excavation will continue in the location of the soil sample.

If the Total DDTs concentration from remaining soils is not greater than 1 mg/kg, excavation will cease in the location of the soil sample.

Consequences of Decision Errors

The decision errors inherent in selecting sampling locations and analyzing chemicals consist of potential errors in sample design, location, heterogeneity, and sample analysis. Any decision errors due to analytical non-conformance will be evaluated during the data review, evaluation and validation process. The nature of any deficiency and the proximity to the associated action level and other quality control measures will be used to assess the usability of the data. Adherence to quality control protocols should reduce the probability of decision errors.

For all samples, the assumption is that the sampling locations and numbers of samples will be sufficient to identify any remaining soil with Total DDTs concentrations above 1 mg/kg.

Null Hypothesis: There are no constituents greater than 1 mg/kg.

False Rejection Error and Consequences: The data indicate that the Total DDTs concentration is greater than the associated criteria (high bias). The excavation of soil would continue in the portion of the excavation represented by this sample, at unnecessary cost.

False Acceptance Error and Consequences: The data indicate that no constituents exceed the criteria (false negative or low bias) and the soil would remain onsite. Contamination would be left in the future wetland area and could adversely affect the species that inhabit the wetland area. The tolerance for the false acceptance error is

extremely low, so any potential for false negatives would be scrutinized during data validation.

Optimize the Sampling Design

Samples will be collected in the locations presented on Figures 1 and 2 of this Appendix. Verification of lateral extent will occur by sampling the sidewall at the top edge of the excavation. Each sample will be analyzed for Total DDTs using USEPA Method SW4042, a field screening method. When the field screening results indicate Total DDTs concentrations do not exceed 1 mg/kg, the sample will be shipped to an off-site laboratory for analysis of Total DDTs using USEPA Method SW8081A.

3.0 FIELD SAMPLING PLAN (FSP)

3.1 Sampling Plan

Confirmation sampling will occur as soon as possible after soil excavation so that results may be used to direct any further excavation without remobilizing. The field sampler may alter the sampling locations based upon site conditions. The actual sample locations, results, and any variances to this sampling plan will be presented in the Remedial Action Report.

3.1.1 UPDD Confirmation Sampling Plan

On the excavation floor, one sample will be collected at each location shown in Figure 1. The locations shown on Figure 1 are spaced at about 100 foot centers along the ditch.

For the excavation perimeter, one sample will be collected for approximately each 100 feet of sidewall. Samples will be collected at the top edge of the sidewall.

3.1.2 SRW Confirmation Sampling Plan

On each excavation floor, one sample will be collected at each location shown on Figure 2.

For the excavation perimeter, one sample will be collected approximately each 100 to 125 feet of sidewall. Samples will be collected at the top edge of the sidewall.

3.2 Analytical Plan

Confirmation samples will be analyzed for Total DDTs on-site using USEPA Method SW4042. Once Method SW4042 results indicate Total DDTs not greater than 1 mg/kg, the sample will be shipped to an off-site laboratory for definitive analysis using Method SW8081A.

3.3 Investigative Equipment and Procedures

All samples will be surface samples and will be collected using various hand tools as appropriate for soil conditions, such as shovels, spoons, and a digger bar, if needed. All samples will be homogenized and then split and placed in glass jars, and labeled as described in Section 3.5.

3.4 Equipment Decontamination Procedures

During sampling activities, appropriate decontamination measures will be taken to minimize sample contamination from sampling equipment. The decontamination procedures for sampling equipment will incorporate the washing steps outlined below.

All sampling equipment (excluding disposable equipment) used in the collection of samples will be decontaminated as described in the following paragraphs. Decontamination should be executed prior to equipment use. Clean disposable gloves will be worn while decontaminating sampling equipment and tools. Clean sampling equipment will not be placed on the ground or other contaminated surfaces prior to use.

Detergent and reagent grade water rinses are the first steps in the decontamination process. Deionized water will be stored in plastic containers and applied via pump sprayers or decanted directly from the storage container. The waste decontamination fluids will be collected and handled in accordance with Section 3.10.

Decontamination will consist of:

1) Wash with non-phosphate detergent,
2) Rinse with potable water,
3) Rinse with analyte free water (type II reagent grade water or equivalent),
4) Air dry,
5) Wrap equipment completely with aluminum foil (shiny side out) and place in a plastic bag to prevent contamination if equipment is to be stored or transported.

3.5 Sampling Containers And Preservation

For samples to be shipped offsite, the laboratory performing the analyses will supply sample containers for this project. For samples to be analyzed onsite, the appropriate sample containers will be supplied. A complete set of sampling containers will be prepared for each sample in advance of the sampling event. These will include glass jars with Teflon™-lined lids and completed sample labels. Containers will be labeled with the date, time, project name, sample number, samplers initials, parameters for analysis, and preservative. Samples shipped to the off-site laboratory will be preserved with ice and a temperature blank included in each cooler to verify the appropriate temperature upon receipt by the laboratory.

3.6 Sample Numbering System

A unique identification number will be assigned to each sample. An alphanumeric sequence will be used, serving as an abbreviation to identify each sample. The abbreviation “CS” will be used to indicate “Confirmation Sample.” UPDD samples shall be numbered starting with HAAF-UPDD-CSX-XXXX. Perimeter samples will have the same identifier with a “N, E, S, or W” added after “CS” to denote which sidewall it was collected from. The XXXX will be replaced with the numerical digits from the closest historical sample identification number. For example, the sample identification designation for the north sidewall of the UPDD excavation, where characterization (and

ultimately excavation) was halted based upon the results from historical sample number HAAF-UPDD-1241 would be HAAF-UPDD-CSN-1241. Floor samples will contain a "B" following the "CS" to denote the bottom of the excavation. The sample identification designation for the bottom of the UPDD excavation, where excavation depth was determined by historical sample number HAAF-UPDD-1234 will be identified as HAAF-UPDD-CSB-1234. Samples from the south of the runway DDT hotspot will be numbered analogously, starting with HAAF-SRW-CSX-XXXX.

3.7 Field Logbook

A field notebook bound with serially numbered pages will be used to record personnel on site, sample identification numbers, sampling date and time, and any significant observations or events during field activities. The project name, site location, sampling event, project leader, telephone number and address of contact office (should the book be misplaced or lost) will be listed in ink. The field notebook is intended to record events during sampling in sufficient detail to allow field personnel to reconstruct events that transpired during the project

The sampling personnel, who will sign and date the notebook prior to initiation of fieldwork will maintain the field notebook. If it is necessary to transfer the logbook to alternative personnel during the course of fieldwork, the person relinquishing the logbook will sign and date the logbook at the time the logbook is transferred and the person receiving the logbook will do likewise. Crossing a line through the entry and entering the correct information will make corrections to erroneous data. The correction will be initialed and dated by the person making the entry. Unused portions of logbook pages will be crossed out, signed, and dated at the end of each workday. Logbook entries must be dated, legible, in ink, and contain accurate documentation. Language used will be objective, factual, and free of personal opinions. Hypotheses for observed phenomena may be recorded, however they must be clearly indicated as such and only relate to the subject observation.

The sample identification number, sample media, number of containers and laboratory analyses to be conducted are recorded with the sample identification number in the field log book and on the chain-of-custody.

The date and time of sample collection, and the personnel who conducted sampling are recorded with the sample identification number in the field logbook and on the chain-of custody form. The names of visitors and other persons on site are also recorded in the field logbook. Sampling personnel will also record the ambient weather conditions and

other conditions at the sampling location that may affect sample collection, the apparent representativeness of the sample, or sample analysis in the field log book.

3.8 Sample Packaging and Shipping

Samples will be transported as soon as possible after sample collection for immunoassay field test kit analysis or offsite laboratory analysis. The following procedures are to be used when packing and transporting samples to the offsite laboratory:

- Use rigid plastic coolers;
- Tape the cooler drain closed both inside and out;
- Wrap glass containers with cushioning material;
- Package samples in individual plastic bags and place in cooler;
- Place a temperature blank in the cooler;
- Package ice in double plastic bags and place bags around, among, and on top of the samples;
- Put paperwork (chain-of-custody record, etc.) in a waterproof plastic bag and tape it to the inside lid of the cooler;
- Tape the cooler lid shut with fiber-reinforced tape;
- Place two signed custody seals on cooler, one at the front right and one at the back left of cooler;
- Attach completed shipping label to the top of cooler and ship following the carrier's instructions.

Sample coolers are typically shipped to the laboratory using an overnight express carrier. A copy of the bill of lading (air bill) is to be retained and becomes part of the sample custody documentation. The offsite laboratory will be notified in advance of all shipments, preferably by telephone on the day of shipment and by advanced scheduling.

3.9 Chain of Custody Procedures

Custody of samples must be maintained and documented from the time of sample collection to completion of the analyses. Each sample will be considered to be in the sampler's custody, and the sampler will be personally responsible for the care and custody of the samples until they are delivered to the courier service for delivery to the laboratory. A sample is considered to be under a person's custody if:

- The sample is in the person's physical possession,
- The sample is in view of the person after that person has taken possession,
- The sample is secured by that person so that no one can tamper with the sample, or
- The sample is secured by that person in an area that is restricted to authorized personnel.

All samples will be accompanied to the off-site laboratory by a chain-of-custody (COC) form. The chain-of-custody form contains the following information:

- Project name,
- Sample numbers,
- Sample collection point,
- Date and time of collection of samples (these must match the date and time recorded on the sample label),
- Sample matrix description,
- Analyses requested for each sample
- Preservation method,
- Number and type of containers used,
- Any special handling or analysis requirements,
- Signature of person collecting the samples,
- Signature of persons involved in the chain of possession,
- Names and telephone numbers of the project points of contact, and
- Airbill Number (none for this project)

The chain-of-custody record forms will be filled out with ink. Prior to packaging samples for shipment, all samples should be double checked against the chain of custody form. When the samples are transferred from one party to another, the individuals will sign, date, and note the time on the form. A separate COC will accompany each delivery of samples to the laboratory. The chain-of-custody form will be included in the cooler used for preservation and transport of the samples. The sampling personnel will retain a copy of the form.

3.10 Investigation Derived Waste

Expected or potential sources of investigation derived waste (IDW) for this project include rinse water from decontamination procedures. The waste decontamination fluids will be collected during the decontamination procedures. Rinse water shall be collected in separate buckets during decontamination. All containers shall be Department of Transportation approved. Each container shall be labeled with a potential hazardous waste label indicating date sample was collected and "Contaminated Waste Water." IDW in each container shall be characterized prior to disposal. If the characterization results indicate the materials in a container are hazardous, the container shall be labeled with a Hazardous Waste Label. USACE will dispose of the small amounts of IDW in accordance with all Federal, state, and local regulations.

Personal protective equipment, including nitrile gloves, will be handled as non-hazardous waste.

4.0 QUALITY ASSURANCE PROJECT PLAN

This section presents functions, procedures, and specific quality assurance (QA) and quality control (QC) activities designed to achieve the data quality goals for the objectives of the sampling effort for the SRW and UPDD sites described in the Data Quality Objectives (DQOs). This section of the work plan is prepared in accordance with EPA QA/R-5, EPA Requirements for Quality Assurance Project Plans (U.S. EPA, 2001), where applicable.

Standard procedures and specifications are established to ensure that all data are comparable, and that data quality is consistently assessed and documented. The specific objectives of this QAPP are to:

- provide standardized references and quality specifications for all anticipated field sampling, analysis, and data review procedures required for the project sites;
- provide guidance and criteria for selected field and analytical procedures; and
- establish procedures for reviewing and documenting compliance with field and analytical procedures.

4.1 Analytical Method

This section contains a brief description of the analytical methods that will be used to analyze soil samples collected for this project. The methods are SW4042, a field method for analysis of Total DDTs and SW3550B and SW8081A, fixed laboratory methods for preparation and analysis of DDD, DDE, and DDT. Various cleanup methods may be employed to meet the quantitation limits required for this project. Some are listed below.

The analytical methods identified in this document is published by the United States Environmental Protection Agency (U.S. EPA) in *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846*, Third Edition (November 1986; Revision 1, July 1992; and Revision 2, November 1992, Update I, August 1993, Update II, September 1994, Update III, 1998). Preservation for the field method is not required, since samples will be analyzed within 4 hours of collection. Preservation for the laboratory method is 4°C. Attachment A summarizes the calibration and the internal quality control procedures for both of these methods. A description of each method follows.

4.1.1 Method SW3550B: Sonication Extraction

Method 3550B is a procedure for extracting nonvolatile and semivolatile organic compounds from solids such as soils, wastes, and sludges. The sonication process ensures intimate contact of the sample matrix with the extraction solvent. A weighted portion of the solid material is mixed with the anhydrous sodium sulfate, ground to form a free-flowing powder, and then dispersed into the methylene chloride. The extract is separated from the sample by vacuum or gravity filtration, or centrifugation, and then dried with anhydrous sodium sulfate and concentrated to an appropriate volume for analysis.

4.1.2 Method SW3630C: Silica Gel Cleanup

Generally, solid-phase extraction cartridges filled with silica gel are used. Aliquots of sample extract are loaded onto the cartridges that are then eluted with suitable solvents, depending upon the analysis method. The collected fractions are analyzed by the appropriate method.

4.1.3 Method SW3640A: Gel-Permeation Cleanup

The extract is passed through a column containing a hydrophobic gel absorbent. The column is then flushed with clean organic solvents to separate the interferences from the analytes of interest by retention time

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4.1.4 Method 3660B: Sulfur Cleanup

The extract is shaken with either copper or tetrabutylammonium sulfite to remove interfering sulfur from the extract. The mixture is allowed to settle and the eluent is removed for analysis.

4.1.5 Method 4042: Immunoassay for Total DDTs

Total DDTs will be analyzed according to Method SW4042 in the field using an immunoassay field test kit. A weighed portion of the soil sample is extracted with deionized water and filtered. An aliquot of the extract and an enzyme-DDT conjugate are added to immobilized DDT antibody. The enzyme-DDT conjugate competes with DDT present in the sample for binding to the DDT antibody. The enzyme-DDT conjugate bound to the DDT antibody then catalyzes a colorless substrate to a colored product. The concentration range is indicated by comparing the color of the sample to the response produced by a reference reaction. The reference standard concentrations will include both 0.2 mg/kg and a 1 mg/kg of DDT. The manufacturer's instructions are included in Attachment B.

4.1.6 Method SW8081A: Organochlorine Pesticides

Method 8081A is used to determine the concentration of various organochlorine pesticides. For this project the methods will be used to determine the concentrations of DDD, DDE, DDT (total DDTs) on a gas chromatograph (GC). Prior to analysis, the sample is extracted into solution. An aliquot of solution is injected into an open-tubular capillary column which separates constituents from one another, and detected by an electron capture detector or electrolytic conductivity detector. Any compounds identified tentatively in the primary analysis are confirmed on a second GC column.

4.2 Calibration Procedures and Frequency

All instruments and equipment used during sample analysis are operated, calibrated, and maintained according to the manufacturer's guidelines and recommendations. Personnel properly trained in these procedures will operate, calibrate, and maintain the instruments. Calibration of instruments is required to ensure that the analytical system is operating correctly and functioning at the proper sensitivity to meet established quantitation limits.

4.2.1 Gas Chromatography

The field of chromatography involves a variety of instrumentation and detection systems. While calibration standards and acceptance criteria vary depending on the type of system and analytical methodology required for a specific analysis, the general principles of calibration apply uniformly. As outlined in EPA SW-846 procedures, each chromatographic system is calibrated prior to performance of analyses using five concentrations by external standard technique for all columns. The lowest calibration standard shall be within a factor of two relative to the QL, and the others corresponding to the expected range of concentrations or defining the working range of the detector. This is done on each chromatographic column and each instrument at the beginning of the contract period and each time a new column is installed. The results are used to determine a calibration curve and response factors for each analyte. Initial calibration consists of determining the working range, establishing limits of detection, and establishing retention time windows. The calibration is checked on a daily basis to ensure that the system remains within specifications. Second column confirmation is required for single compound analytes.

Continuing calibration standards are analyzed to check the instrument response relative to the initial calibration curve at the beginning and end of each analytical run. Calibration checks are also performed for overall system performance and for retention time shifts, as

specified in SW-846. Individual and standard mixes are analyzed to establish response factors and absolute retention time. The response factors and retention times are verified throughout the analytical run and at the end of the analytical sequence. Each analyte must be within its retention time window or the analyst shall take corrective action. Calibration procedures for all GCs are summarized in the method-specific tables in Attachment A.

4.2.2 Immunoassay Test Kits

Calibration for the immunoassay test kits consists of at least two standard and a blank. A small photometer is used to measure the Total DDTs in prepared samples and standards. The photometer is shipped directly from the manufacturer of the test kits (Strategic Diagnostics, Incorporated) and is maintained at their facility. Standards are prepared at two concentrations with each batch of samples according to the manufacturer's instructions.

4.3 Standard and Reagent Preparation

A critical element in the generation of quality data is the purity and traceability of the standard solutions and reagents used in the analytical operations. The preparation and maintenance of standards and reagents will be performed per the specified analytical methods. The laboratory shall continually monitor the quality of reagents and standard solutions through a series of well-documented standard operating procedures (SOPs). In general, SOPs for standards preparation should incorporate the following items:

- Documentation and labeling of date received, lot number, date opened, and expiration date;
- Documentation of traceability;
- Preparation, storage, and labeling of stock and working solutions; and
- Establishing and documenting expiration dates and disposal of unusable standards.

Primary reference standards and standard solutions used by the laboratory are to be obtained from the National Institute of Standards and Technology, or other reliable commercial sources to ensure the highest level of purity possible. All standards and standard solutions shall be catalogued to identify the supplier, lot number, purity/concentration, receipt/preparation date, preparer's name, method of preparation, expiration date, and all other pertinent information included in the specific SOP. Standard solutions and reagents are validated prior to use. Validation procedures can range from a check for chromatographic purity to verification of the concentration of the

standard using a standard prepared at a different time, concentration or source. Reagents are examined for purity by subjecting an aliquot or subsample to the analytical method in which it will be used; for example, every lot of dichloromethane (for organic extractables) is analyzed for undesirable contaminants prior to use in the laboratory. Stock and working standards are checked regularly for signs of deterioration, such as discoloration, formation of precipitates, or change in concentration.

4.4 Field Quality Control Checks

Quality control checks in the field will include the collection of field duplicates and temperature blank samples. These QC checks are described below.

4.4.1 Field Duplicates

QC duplicate samples collected in the field will provide precision information for the entire measurement system, including sample acquisition, homogeneity, handling, shipping, storage, preparation, and analysis. The field duplicates will be placed in a separate sample jar from the normal sample after homogenization of the sample in the mixing bowl. The identity of these samples will be held blind to the analysts and laboratory personnel until the data are in deliverable form. Duplicate analyses will be performed on approximately 10% of the total investigative samples for each method. QC sample locations are defined in this FSP; however, the locations may be adjusted based on information determined in the field. Odors or visual indicators may be used to assist in directing the location of QC samples to areas suspected to have the highest concentrations of the contaminants of interest. Duplicate samples will be analyzed by the laboratory for the same parameters as the primary sample (i.e., the sample that is being duplicated).

4.4.2 Temperature Blanks

A small sample container of water will be labeled as a temperature blank. One temperature blank will be included in each cooler. The temperature blank will be packaged and handled in the same manner as the other samples to assure that its temperature is representative of the samples in that cooler. The laboratory will use a calibrated thermometer to directly measure the temperature of this sample. The temperature reading from the temperature blank will be used to determine whether samples were stored under the appropriate thermal conditions.

4.5 Laboratory Quality Control Checks

The project laboratories will have a QA/QC program that monitors data quality with internal QC checks. Internal QC checks are used to determine if laboratory operations

are in-control (i.e., operating within acceptable QC guidelines) during data generation and the effect the sample matrix has on the data being generated.

Laboratory performance QC is based on the use of a standard control matrix to generate precision and accuracy data that are compared, on a daily basis, to control limits (CLs). **The control limits are laboratory-specific and shall be derived statistically from recent data produced by the laboratory.** The number of samples used to develop the statistical CLs shall be all those analyzed within the previous six months or a minimum of 20 data points. The laboratory shall statistically calculate CLs for all analytes from laboratory control samples (LCSs) and for surrogates from method blanks and/or LCSs. Corrective action shall be based upon these laboratory limits. Sporadic marginal failures are acceptable for no more than five percent of the analytes in any given analyte suite. Comparison recovery limits are presented in Appendix A only for assessment of the laboratory-specific CLs. The comparison recovery limits are based upon statistically-derived limits using data from numerous laboratories to ensure that the laboratory can produce data with acceptable accuracy. Standard limits were estimated for each method with multiple analytes. If the laboratory statistical limits are consistently different from the comparison limits, a different laboratory shall be selected for that analytical method, or an alternate analytical or preparation method shall be selected that increases the accuracy of that method within the primary laboratory. The laboratory performance QC information, in conjunction with method blank data, is used to assess daily laboratory performance.

Matrix effects are assessed by using an actual environmental sample for precision and accuracy determinations. This information can be obtained from matrix spike and matrix spike duplicate results and /or surrogate results. Matrix effects are observed when recoveries are outside the statistical limits for analysis of a clean matrix. These include LCS recovery limits for analytes and surrogate recovery limits from method blank and/or LCS analyses. Corrective actions are not required for non-compliant MS/MSD or surrogate results if the laboratory provides evidence of matrix interference. This may include chromatograms with peaks at or near the same retention time as the spiked compound or surrogate, or consistent MS and MSD pair recoveries or out-of-control surrogate recoveries from multiple project samples where laboratory performance QC samples indicate the analytical system is in control.

Laboratory performance QC will be provided as a standard part of every routine analysis. Matrix-specific QC will be required when identified on the COC by field personnel, but at a minimum of 5% of samples per method per matrix.

The analytical batch is defined as a preparation batch when no separate preparation of the sample is required. The analytical batch and preparation batch shall not exceed 20 samples and are defined as a set of samples that are analyzed or prepared concurrently or sequentially. Significant gaps (greater than two hours) in the analytical sequence will result in the termination of the previous sequence and the initiation of a new analytical sequence. The preparation batch shall be analyzed sequentially on a single instrument, when possible. Only instrument QC such as calibration checks and instrument blanks may be run in the sequence when any sample requires reanalysis or dilution outside of the initial analytical sequence. The practice of "holding a batch open" and performing a single set of batch QC samples for all analyses performed during that period is unacceptable.

The laboratory shall analyze internal QC samples at the frequency specified in this QAPP. These QC samples for each preparation batch shall include, at a minimum, one method blank and one LCS. The matrix used for LCS analyses shall be reagent grade water for aqueous analyses and reagent sand for soil/sediment matrices.

A brief summary of the required QC samples follows.

4.5.1 Blanks

Two types of blanks routinely analyzed in the laboratory are method blanks and reagent blanks. Method blanks and reagent/solvent blanks are used to assess laboratory procedures as possible sources of sample contamination.

Method or preparation blanks for all samples consist of deionized water or reagent sand that is subjected to the entire analytical procedure, including extraction, distillation, digestion, etc., as appropriate for the analytical method being utilized. One method blank will be analyzed for each analytical batch (minimum of one per day; one every 12 hours for GC/MS analyses). If the blank does not meet acceptance criteria, the source of contamination will be investigated and appropriate corrective action will be taken and documented. Investigation includes an evaluation of the data to determine the extent and effect of the contamination on the sample results. Corrective actions may include reanalysis of the blank and/or repreparation and reanalysis of the blank and all associated samples. No method blank may exhibit a detected concentration greater than the quantitation limit. However, exceptions may be made when the analyte is not detected in the related sample. Sample results are not corrected for blank contamination unless required by the analytical method.

Reagent/solvent blanks consist of individual reagents or solvents subjected to the entire analytical procedure as appropriate for the analytical method being utilized. The blanks

are only used if contamination problems are indicated by the method blank or if a new lot of materials are being checked before use.

4.5.2 Laboratory Control Samples

Laboratory control samples (LCS) are used as a means of evaluating the efficiency of the analytical process. As discussed above, LCS is used to generate precision and accuracy data that are compared, on a daily basis, to control limits. Laboratory control samples are subjected to the entire sample procedure, including extraction, digestion, etc., as appropriate for the analytical method utilized. They are generally introduced into an analytical batch (20 samples) immediately before extraction or analysis. LCS samples will be performed for both inorganic and organic laboratory methods.

4.5.3 Matrix Spikes and Matrix Spike Duplicates

A Matrix Spike (MS) is an environmental sample to which known concentrations of analytes have been added. The MS is taken through the entire analytical procedure and the recovery of the analytes is calculated. Results are expressed as percent recovery. The MS is used to evaluate the effect of the sample matrix on the accuracy of the analysis.

A Matrix Spike Duplicate (MSD) is a duplicate of the environmental sample described above, each of which is spiked with known concentrations of analytes. The two spiked samples are processed separately and the results compared to determine the effects of the matrix on the precision and accuracy of the analysis. Results are expressed as relative percent difference (RPD) and percent recovery (%R).

4.5.4 Surrogate Recoveries

Surrogates are organic compounds which are similar to the analytes of interest in chemical behavior, but which are not normally found in environmental samples. Surrogates are added to samples to monitor the effect of the matrix on the accuracy of the analysis for each sample. Results are reported in percent recovery. Laboratories routinely add surrogates to samples requiring GC or GC/MS analysis and report these surrogate recoveries to the client. The laboratory does not modify its operations based on surrogate recoveries in environmental samples. However, obvious problems with sample preparation and analysis (e.g. evaporation to dryness, leaking septum, etc.) which can lead to poor surrogate spike recoveries must be ruled out prior to attributing low surrogate recoveries to matrix effects.

4.6 Sensitivity

The laboratory must determine and document the limits of detection and quantitation on a periodic basis. The method of determination for each is described below.

4.6.1 Method Detection Limit (MDL)

The MDL is the lowest concentration at which a specific analyte in a matrix can be measured and reported with 99-percent confidence that the analyte concentration is greater than zero. MDLs are experimentally determined for each target analyte of the method. Each individual instrument will maintain a current MDL study. MDLs are based on the results of seven spikes of clean matrix at the estimated MDL and are statistically calculated in accordance with the Title 40, Code of Federal Regulations Part 136 (40 CFR 136), Appendix B. The standard deviation of the seven replicates is determined and multiplied by 3.143 (i.e., the 99-percent confidence interval from the one-sided student t-test). The MDLs are updated annually and whenever significant instrument maintenance is performed. Alternatively, the MDLs can be verified on a quarterly basis by analyzing a standard no more than two times the calculated MDL.

4.6.2 Quantitation Limit

The QL is defined by the lowest concentration in the multi-point initial calibration. The QL is the lowest level for quantitation decisions based on individual measurements for a given method and representative matrix. The QLs shall be considered maximum QLs; the project laboratory may report lower QLs if supported by the lowest concentration of the initial calibration. QLs may be adjusted based upon the capability of the selected laboratory. Detected results above the MDL but below the QL shall be qualified with a J flag. The J flag will denote the sample results as below the QL and as qualitative, estimated concentrations. Analyst judgment will be used to determine if an apparent detected value should be reported or appears to be a false positive due to the sample matrix (e.g., from baseline “noise”).

If dilution is necessary to bring the reported concentration of a single compound of interest within the linear range of the calibration, results in non-detect values for all other analytes, the results of the original undiluted, or less diluted run will be reported for those analytes. The diluted result will be reported for the compound(s) with the high concentrations. Appropriate notations shall be included in the narrative of the report. Matrix effects (i.e., highly contaminated samples requiring dilution for analysis, dilution to bring detected levels within the range of calibration, and matrix interference requiring elevation of detection limits) will be considered in assessing compliance with the requirements for sensitivity. However, cleanup procedures must be used to minimize interferences and lower the QLs.

The QLs required for this project area listed below.

Method SW4042 – Total DDTs QL = 0.2 mg/kg

Method SW8081A – DDD, DDE, DDT QLs = 0.005 mg/kg AFTER correction for dry weight and any dilution not due to high analyte concentrations

4.7 Corrective Action

The laboratory QA Director in consultation with the project chemist is responsible for implementing corrective actions in the laboratory. It is their combined responsibility to see that all analytical and sampling procedures are followed as specified and that the data generated meet the acceptance criteria. Corrective action procedures are summarized for each method in Appendix A.

Corrective actions for the laboratory may include, but are not limited to:

- Reanalyzing samples;
- Correcting laboratory procedures;
- Recalibrating instruments using freshly prepared standards;
- Replacing solvents or other reagents that give unacceptable blank values;
- Training laboratory personnel in correct sample preparation and analysis procedures; and
- Accepting data with an acknowledged and documented level of uncertainty.

Whenever corrective action is deemed necessary, the Laboratory Director will ensure that the following steps are taken:

- The problem is defined;
- The cause of the problem is investigated and determined;
- Appropriate corrective action is determined; and
- Corrective action is implemented and its effectiveness verified.

If the laboratory determines that failure to meet QC criteria for accuracy or precision is a result of objectively verifiable matrix effects, no further re-extractions will be required. However, the narrative must contain an explicit description of the laboratory's rationale in this regard with reference to objectively verifiable features of raw data and contain documentation to support that rationale. The sufficiency of the laboratory's explanation will be determined by the USACE Project Chemist.

Out-of-control analyses are generally described on a QA/QC discrepancy form and submitted to the laboratory supervisor for corrective action. Copies are distributed to the laboratory QA coordinator and laboratory director for approval, and to the case file. The calibration information is filed with the raw data in the reports area.

4.8 Laboratory Data Reduction and Verification

All analytical data generated within the laboratories shall be reviewed prior to report generation to verify the reported data. The data verification process consists of data generation, reduction, and three levels of documented review. In each stage, the review process will be documented by the signature of the reviewer and the date reviewed.

The analyst who generates the analytical data will have the prime responsibility for the correctness and completeness of the data. All data will be generated and reduced following protocols specified in laboratory SOPs. Each analyst will review the quality of his or her work based on an established set of guidelines outlined in the SOPs. The analyst will review the data package to ensure that:

- The correct samples were analyzed and reported in appropriate units,
- Preservation and holding time requirements were met,
- Sample preparation information is correct and complete,
- Appropriate SOPs have been followed,
- Analytical results are correct and complete,
- QC samples are within established control limits,
- Blanks are within appropriate QC limits,
- Special sample preparation and analytical requirements have been met, and
- Documentation is complete (e.g., all anomalies in the preparation and analysis have been documented, anomaly forms are complete; holding times are documented, etc.).

The data reduction and verification steps shall be documented, signed and dated by the analyst. The analyst will then pass the data package to a senior analyst or supervisor, who will perform an independent review of the data package. This review is also to be conducted according to an established set of guidelines and to be structured to ensure that:

- Calibration data are scientifically sound, appropriate to the method, and completely documented,
- QC samples are within established guidelines,
- Qualitative identification of sample components is correct
- Quantitative results are correct,
- Documentation is complete and correct (e.g., anomalies in the preparation and analysis have been documented; anomaly forms are complete; holding times are documented, etc.), and
- The data are ready for incorporation into the final report; and the data package is complete and ready for data archive.

The review is to be structured so that all calibration data and QC sample results are reviewed and all of the analytical results from 10% of the samples are checked back to the bench sheet. If no problems are found with the data package, the review is complete. If any problems are found with the data package, an additional 10% of the samples will be checked to the bench sheet. This process will continue until no errors are found or until the data package has been reviewed in its entirety.

Data reviews shall be documented and the signature of the reviewer and the date of review recorded. The reviewed data are then approved for release and a final report is prepared. Before the report is released to the client, the data are reviewed for completeness and to ensure that the data satisfy the overall objectives of the project. This review is typically done by the laboratory Project Manager.

Each step of this review process involves evaluation of data quality based on both the results of the QC data and the professional judgment of those conducting the review. This application of technical knowledge and experience to the evaluation of the data is essential in ensuring that data of high quality are generated consistently.

4.9 Laboratory Data Reporting

At the conclusion of all analytical work for this project, the primary laboratory will submit a comprehensive certificate of analysis. The final certificates of analysis will be submitted no later than 21 days after the last sample has been submitted to the laboratory for the project. All samples shall be reported in a legally defensible package. Legible

copies of all data shall be organized systematically on numbered pages. A table of contents shall be provided at the beginning of the data package. All data packages will contain the following information.

- Case Narrative: The case narrative will be written and the release of data will be authorized by the laboratory director or his/her designee. Items to be included in the case narrative are the field sample ID with the corresponding laboratory ID, parameters analyzed in each sample and the methodology used (EPA method numbers or other citation), detailed description of all problems encountered and corrective actions taken, discussion of possible reasons for out-of-control QA/QC results, and observations regarding any occurrences which may affect sample integrity or data quality.

- Chain-of-Custody Documentation: Legible copies of COCs for each sample will be included in the data package. Cooler receipt forms associated with the corresponding COC and any integral laboratory-tracking document will also be included.

- Summary of Environmental Results: For each environmental sample analysis, this summary shall include field ID and corresponding laboratory ID, sample matrix, date of sample extraction (if applicable), date and time of analysis, identification of the instrument used for analysis, instrument specifications, weight or volume of the sample used for analysis/extraction, dilution or concentration factor used for the sample extract, MDL or QL, definitions of any data qualifiers used, and analytical results.

- Summary of QA/QC Results: The QA/QC results will be presented in summary form. Acceptance limits for all categories of QC criteria will be provided with the data. Specific QC data for organic and inorganic analyses to be included in the data package are method blank results, laboratory control samples, matrix spike/matrix spike duplicate results, and surrogate spike results.

- Initial Calibration: The concentrations of the standards used for analysis and the date and time of analysis. The response factor, RSD, and retention time for each analyte will be included in initial calibration summaries. Information demonstrating the samples or dates for which a single initial calibration applies shall also be provided.

- Calibration Verification Standard and Second Source Standard: The concentration of the calibration standard used for calibration verification and the second source standard will be reported. The response factor, percent difference, and retention time (GC and GC/MS) for each analyte will be reported. Daily calibration information will be linked to sample analyses by summary.
- Compound Identification (GC and GC/MS): The retention times and the concentrations of each analyte detected in environmental and QC samples will be reported for both primary and confirmation analyses. The raw data for each analysis will include chromatograms (with target compound, internal standard, and surrogate compounds labeled by name) with a quantitation report and/or area printout, as applicable. GC/MS analyses will also include the mass spectra and ion chromatograms for each reported analyte in the sample along with the spectra of the standard analyte itself.
- Method detection limit study: The date, instrument, spiking amount and matrix will be included with the seven replicates for the method detection limit study associated with the analysis of project samples.

4.10 Records Storage

All records related to the analytical effort are maintained at the primary laboratory in secured filing cabinets (i.e., cost information, scheduling, and custody). All records are maintained for five years after the final report is issued. Additional types of records to be maintained by the laboratory for the project include the following:

- All electronic copies of instrument analyses, along with the type of software used to reduce the data
- Any discrepancy/deficiency report forms due to problems encountered during sampling, transportation, or analysis
- Sample destruction authorization forms containing information on the manner of final disposal of samples upon completion of analysis
- All laboratory notebooks including raw data readings, calibration details, QC checks, etc.

Field and laboratory data packages shall be stored in hard copy and electronic format (when applicable) as part of the project file. This information is retained in the project file until project completion and closeout. Upon project closeout, all records shall be archived for permanent storage for a minimum of five years.

4.11 Preventive Maintenance

To minimize downtime and interruption of analytical work, preventive maintenance is routinely performed on each analytical instrument. Each laboratory shall have detailed SOPs on file that describe preventive maintenance procedures and schedules. All service and maintenance will be conducted by qualified laboratory staff or under service agreement with the manufacturer or their approved agent. All repairs, adjustments, and calibrations will be documented in a maintenance notebook or data sheet that will be maintained in a permanent file. The instrument notebook will clearly document the date, the problem description, corrective action taken, results of actions, and the name of the person performing the work.

4.12 Assessments

4.12.1 Laboratory and Field Audits

All laboratories analyzing samples from the USACE are required to be USACE validated. USACE validation is an evaluation of laboratory procedures or documentation and includes initial and periodic laboratory audits. The laboratory on-site inspections or audits are performed by USACE chemists from the Center of Excellence in Omaha, Nebraska. The inspectors verify the following:

- The organization and personnel are qualified to perform assigned tasks,
- Adequate facilities and equipment are available,
- Complete documentation, included chain-of-custody of samples, is being implemented,
- Proper analytical methodology is being used without deviations, adequate analytical quality control (including reference samples, control charts, documented corrective actions, etc.) is being provided,
- Acceptable data handling and documentation techniques are being used,
- Adequate facilities and operations are installed to ensure laboratory health and safety, and
- Proper waste disposal procedures are implemented.

The on-site laboratory inspection helps to ensure that the laboratory is technically competent and that all the necessary quality control is being applied by the laboratory in order to deliver a quality product.

4.12.2 Laboratory Performance Evaluation Samples

At a minimum, the contract laboratory will participate in at least one performance evaluation program.

The performance evaluation (PE) samples are single blind (prepared by the laboratory from ambulated standards) and are often associated with the regular laboratory audits performed by the USACE and/or regulatory agencies. USACE, Center of Excellence, Omaha, Nebraska reviews the results of the PE samples to determine if the laboratory should continue to receive USACE validation.

4.12.3 Quality Assurance Samples

QA samples are replicate samples submitted to a different laboratory, and subjected to the same environmental conditions and steps in the measurement process as the primary sample. They serve as an oversight function in assessing the analytical portion of the measurements system. QA samples will be collected once during the SI field effort for the groundwater samples.

4.12.4 Data Validation

The laboratory data will be validated using guidelines in the attached table. The validation guidelines are based on EPA SW-846 methods and the EPA National Functional Guidelines for Organic and Inorganic Data Review. The procedures in this document shall supercede the procedures in these references. However, professional judgment shall be used when deciding if qualification of data is applicable. When professional judgment is applied that differs from the qualification scheme, the rationale shall be provided. Data validation will be performed by personnel in the Environmental Chemistry Section, Sacramento District, USACE. The report shall be accompanied by tables of qualified data and the reasons for qualification.

Data Qualifier Conventions

Quality Control Item	Evaluation	Data Qualifier Flag		Sample(s) Qualified
		Detects	Nondetects	
Holding Times (Extraction/Analysis)	1) Holding time exceeded by 2 times or less 2) Holding time exceeded by greater than 2 times	J- J-	UJ R	Sample
Cooler Temperature	1) > 6 and ≤10 degrees Centigrade 2) >10 degrees Centigrade 3) < 2 degrees Centigrade	J- J- No qual.	UJ R No qual.	All samples shipped in the affected cooler
Initial Calibration	1) %RSD > 20% 2) r < 0.995, r^2 <0.990	J J	UJ UJ	All samples run on the same instrument under that initial calibration
Initial and Continuing Calibration Verification (ICV and CCV) and Second Source Standard	1) % Difference > +20% 2) % Difference < -20% and ≥ -50% 3) % Difference < -50%	J+ J- J-	No qual. UJ R	All samples bracketed by the ICV, CCV or under initial calibration associated with second source standard
Method Blank Contamination	1) Sample results for common lab contaminant less than or equal to 10 times the blank contamination 2) Sample results for other compounds less than or equal to 5 times the blank contamination	U U	No qual. No qual.	All samples in the same preparation batch
Surrogate Recovery	1) % Recovery < control limit (CL) but ≥ 10% 2) % Recovery <10% 3) % Recovery > CL	J- J- J+	UJ R No qual.	Sample
Matrix Spike Recovery	1) % Recovery < CL but ≥ 10% 2) % Recovery <10% 3) % Recovery > CL 4) RPD > CL	J- J- J+ J	UJ R No qual. UJ	Parent Sample
Laboratory Control Sample Recovery	1) % Recovery < CL but ≥ 10% 2) % Recovery <10% 3) % Recovery > CL 4) RPD > CL	J- J- J+ J	UJ R No qual. UJ	All samples in the same preparation batch
Quantitation Limits	Quantitation limits not matching the project specified limits. Results reported below the quantitation limit.	No qual. J	No qual. No qual.	Sample (note in validation report) Sample

Quality Control Item	Evaluation	Data Qualifier Flag		Sample(s) Qualified
		Detects	Nondetects	
Field Duplicates	RPD > 25 (water); >50 (soil)	No qual.	No qual.	Parent sample-review dataset for systematic occurrences
Equipment Blanks	1) Sample results for common lab contaminant less than or equal to 10 times the blank contamination	U	No qual.	All samples in the same sampling event
	2) Sample results for other compounds less than or equal to 5 times the blank contamination	U	No qual.	
Trip Blanks	1) Sample results for common lab contaminant less than or equal to 10 times the blank contamination	U	No qual.	All samples in the same cooler
	2) Sample results for other compounds less than or equal to 5 times the blank contamination	U	No qual.	

% = percent
CCV = Continuing Calibration Verification Standard
CL = Control Limit
ICV = Initial Calibration Verification Standard
J = Estimated Concentration
J- = Estimated Concentration Biased Low
J+ = Estimated Concentration Biased High
r = coefficient of variation
r^2 = Correlation Coefficient
R = rejected datapoint
RPD = Relative Percent Difference
RSD = Relative Standard Deviation
U = Not Detected
UJ = Not Detected; Reporting Limit may be higher than reported

4.13 Data Quality and Usability Assessment

The effectiveness of a QA program is measured by the quality of data. Data quality is judged in terms of its PARCC parameters. Once the PARCC parameters are assessed, the usability of any affected results will be determined based upon the objectives addressed in the Data Quality Objectives. The PARCC terms are described as follows:

4.13.1 Precision

Precision is a measure of the reproducibility of analyses under a given set of conditions. Precision will be assessed by comparing the results of replicate measurements of reference materials and environmental samples.

4.13.2 Accuracy

Accuracy is a determination of how close the measurement is to the true value. Accuracy will be assessed by the comparison of standard concentrations and instrument response and by any external contamination evident from laboratory blank results.

4.13.3 Representativeness

Representativeness is a qualitative parameter that reflects the extent to which a given sample is characteristic of a given population at a specific location or under a given environmental condition. Representativeness is best satisfied by making certain that sampling locations are selected properly, a sufficient number of samples are collected, and an appropriate sampling technique is employed. Analytical data should represent the sample analyzed regardless of the heterogeneity of the original sample matrix. Sample representativeness will also be evaluated based on results from laboratory blanks.

4.13.4 Completeness

Completeness will be evaluated qualitatively and quantitatively. The qualitative evaluation of completeness will be determined as a function of all events contributing to the sampling event including items such as correct handling of COC forms, incorporation of QC samples at the appropriate frequency, etc. The quantitative description of completeness is defined as the percentage of acceptable QC parameters that can be controlled. The goals for field sampling and analytical completeness is 100%. Any samples or standards producing questionable results will be reanalyzed.

4.13.5 Comparability

Comparability expresses the confidence with which one data set can be compared to another data set measuring the same property. To ensure comparability, field procedures will be standardized and field operations will adhere to standard operating procedures. Analytical data comparability will be assured by use of established and approved analytical methods, consistency in the basis of analysis (wet weight, volume, etc.), and consistency in reporting units (µg/L, mg/Kg, etc.).

5.0 REFERENCES

EPA 1998. *Test Methods for Evaluating Solid Waste*, USEPA SW-846, Third Edition, (Update III), June.

EPA 2000a. *Guidance for Data Assessment*, USEPA QA/G-9, Final, July.

EPA 2000b. Guidance on the Data Quality Objectives Process, USEPA QA/G-4, Final, August.

EPA 2001. EPA Requirements for Quality Assurance Project Plans, EPA QA/R-5, Final Interim Final, March.

ATTACHMENT A

CALIBRATION AND QUALITY CONTROL PROCEDURES

Calibration and Quality Control Procedures for Method 4042

Analytical Method	Applicable Parameter	Quality Control Check	Minimum Frequency	Acceptance Criteria	Corrective Action
SW4042	Total DDTs	Two-point calibration standards at 0.2 and 1.0 mg/kg	Prepare and analyze during sample preparation and analysis for each batch	Response of the standards should be inversely relational to concentration	Reanalyze batch
		Method Blank	1 per batch	Response greater than the 0.1 mg/kg standard response	Investigate possible source of problem. Take appropriate corrective action. Reanalyze batch.
		Duplicate preparation and analysis	1 per batch	Equivalent result (< 0.2 mg/kg; >0.2 <1 mg/kg; or >1 mg/kg)	Identify potential source of problem and correct. If source is not apparent, reanalyze same sample and duplicate in following batch to verify heterogeneity.

Calibration and Quality Control Procedures for Method 8081A

Analytical Method	Applicable Parameter	Quality Control Check	Minimum Frequency	Acceptance Criteria	Corrective Action
SW8081	Total DDTs	Five-point initial calibration	Prior to sample analysis and when CCV fails	Option 1: RSD for each analyte ≤ 20% Option 2: Grand mean RSD ≤ 20%, with no individual analyte RSD >30% Option 3: Linear regression – r ≥ 0.995 Option 4: Non-linear regression COD $r^2 \geq 0.990$ (6 points for 2nd order, 7 points for 3rd order)	Correct problem then repeat initial calibration.
		Second source standard (not required if calibration verification below is prepared with a second source of the standard)	Following initial calibration	% Difference from expected value ≤ 15% for all analytes OR grand mean ≤ 15% with no individual response factor greater than 20%	Correct problem, rerun second source standard. If that fails, repeat initial calibration.
		DDT and endrin breakdown check	Daily prior to analysis of samples	Degradation < 15%	Correct problem, then repeat breakdown check.
		Calibration verification	ICV: At the beginning of an analysis sequence CCV: After every 10 field samples and at the end of the analysis sequence	Response factor for all analytes within ±15% of initial calibration response factor OR grand mean within 15% with no individual response factor greater than 25%	ICV: Correct problem, rerun ICV. If that fails, repeat initial calibration CCV: Correct problem, then repeat CCV and reanalyze all samples since last successful CCV or ICV

Calibration and Quality Control Procedures for Method 8081A

Analytical Method	Applicable Parameter	Quality Control Check	Minimum Frequency	Acceptance Criteria	Corrective Action
SW8081	Organochlorine Pesticides	Method Blank	1 per preparation batch	All analytes < ½ QL.	Investigate possible contamination source. Take appropriate corrective action. Reprepare and reanalyze all samples processed with a contaminated blank, unless analyte is not detected in associated samples or present at greater than 10x blank concentration.
		Laboratory Control Sample	1 per preparation batch	Comparison recovery limits 60-130%(water), 50-150% (soil)	Correct problem, then reprepare and reanalyze LCS and all samples in the associated preparatory batch for failed analytes.
		Matrix Spike and Matrix Spike Duplicate	1 MS/MSD per 20 project samples when identified on the Chain-of-Custody	Comparison recovery limits 60-130% (water), 50-150% (soil) and RPD <35% for soil samples RPD <20 % for water samples	Evaluate for supportable matrix effect. If no interference is evident reprepare and reanalyze MS/MSD and all samples in the preparation batch once within the holding time. If still out report both sets of data.
		Surrogate spike	All field and quality control samples	Comparison recovery limits 60-130% (water), 50-150% (soil)	Evaluate for supportable matrix effect. If no interference is evident reprepare and reanalyze affected sample(s).
		Confirmation of positive results (second column or second detector)	All detected results at or above the QL must be confirmed.	Calibration and QC criteria same as for initial or primary column analysis. Results between primary and secondary column RPD ≤ 40%	None – report as detected result if criteria is met. Use professional judgment to determine whether primary or secondary column concentration should be reported. Report as not detected at QL if criteria is not met.
		Quantitation limit standard (lowest concentration on initial calibration curve)	Verify at least once for every matrix and field effort	QLs established shall not exceed those in the Appendix B tables.	QLs that exceed established criteria shall be submitted to USACE Project Chemist for approval prior to analysis of any project samples.

ATTACHMENT B

IMMUNOASSAY TEST INSTRUCTIONS

STRATEGIC DIAGNOSTICS INC.
EnviroGard® DDT in Soil Test Kit
73100

Intended Use
The EnviroGard DDT in Soil Test Kit is a qualitative or semi-quantitative field test for the detection of DDT and its metabolites DDD and DDE in soil. The EnviroGard DDT in Soil Test Kit allows rapid semi-quantitative screening for DDT at 0.2, 1.0, and 10.0 parts per million (ppm) in soils.

Test Principles
The EnviroGard DDT in Soil Test Kit is based on the use of polyclonal antibodies that bind either DDT or DDT-Enzyme Conjugate. These antibodies are immobilized to the walls of the test tubes. When DDT is present in the sample, it competes with the DDT-Enzyme Conjugate for a limited number of antibody binding sites.

Since there are the same number of antibody binding sites on every test tube and each test tube receives the same number of DDT-Enzyme Conjugate molecules, a sample that contains a low concentration of DDT allows the antibody to bind many DDT-Enzyme Conjugate molecules.

Therefore, a low concentration of DDT produces a dark blue solution. Conversely, a high concentration of DDT allows fewer DDT-Enzyme Conjugate molecules to be bound by the antibodies, resulting in a lighter blue solution.

NOTE: Color is inversely proportional to DDT concentration.

Darker color = Lower concentration
Lighter color = Higher concentration

Performance Characteristics
The EnviroGard DDT in Soil Test Kit will not differentiate between DDT, its metabolites, and other structurally similar compounds, but will detect their presence to differing degrees. The following table shows a number of compounds and the approximate concentration of each required to yield a positive result (Lower Limit of Detection or LLD), and the concentration required to inhibit one-half of the color developed by the Negative Control (IC50). Concentration is in parts per million (ppm) in soil.

Compound	LLD	IC50
p,p'-DDT (kit calibrator)	0.04	1.25
p,p'-DDD	0.01	0.3
p,p'-DDE	0.18	3.6
o,p'-DDT	4	93
o,p'-DDD	0.4	11
o,p'-DDE	3	93
DDA	0.002	0.04
Chloropropylate	0.007	0.08
Chlorobenzilate	0.03	0.35
Dicofol	0.14	2
Tetradifon	1.2	14
Thiobencarb	5	52
Tebuconazole	7	95
Neburon	17	284
Chloroxuron	24	216
Monolinuron	25	714
Diclofop	70	>1000

The following compounds have lower limits of detection > 100 ppm:

2,4-D	4-chlorophenoxyacetic acid
Chlorbromuron	Chlordane
Chlortoluron	Dicamba
Diflubenzuron	Diuron
Lindane	Linuron
MCPA acid	MCPB
Mecoprop	

Precautions
• Treat DDT, solutions that contain DDT and potentially contaminated soil samples as hazardous materials.
• Where appropriate, use gloves, proper protective clothing, and methods to contain and handle hazardous material.
• Store all test kit components at 4°C to 8°C (39°F to 46°F) when not in use.
• Do not freeze test kit components or expose them to temperatures greater than 37°C (99°F).
• Allow all reagents to reach ambient temperature (18°C to 27°C or 64°F to 81°F) before beginning the test.
• Do not use test kit components after the expiration date.
• Do not use reagents or test tubes from one test kit with reagents or test tubes from a different test kit.
• Use approved methodologies to confirm any positive results.
• Do not dilute or adulterate test reagents or use samples not called for in the test procedure; this may give inaccurate results.
• Tightly recap the DDT calibrator vials to prevent evaporative loss.
• Distribution of DDT in soils may be highly variable. The use of a composite sampling technique may be appropriate. Development of a sampling plan that assures adequate sample number and distribution is the responsibility of the analyst.
• DDT is light sensitive. Store soil extracts at 2°C to 7°C, shielded from direct light.

Materials Provided
EnviroGard DDT in Soil Test Kit
This test kit contains the following items:
20 Antibody-Coated Test Tubes
1 vial of Assay Diluent
1 vial of Negative Control (methanol)
1 vial of 0.2 ppm DDT Calibrator in methanol
1 vial of 1.0 ppm DDT Calibrator in methanol
1 vial of 10.0 ppm DDT Calibrator in methanol
1 vial of DDT-Enzyme Conjugate
1 vial of Substrate
1 vial of Stop Solution
1 20-place Test Tube Rack

22 Pipette Tips, yellow (for the Gilson M-25 Microman® Positive Displacement Pipettor)

Materials Required but Not Provided
You will also need several other items, some of which are included in the EnviroGard Soil Field Lab.

- Methanol-ACS reagent grade Methanol is required for soil extraction, but is not included in the EnviroGard Soil Extraction Kit. You must order it separately.
- EnviroGard Soil Extraction Bottle Kit

Use this kit for the extraction of DDT in soil samples. This kit contains enough devices to process 14 samples:
• 14, 30 mL LDPE Bottles with screw caps (each bottle contains stainless steel mixing beads)
• 14 filtration caps
• 14 Millex® HV_{13} filters
• 18 Wooden Spatulas
• 1 Syringe with coupler
• 1 Syringe coupler
• 14 Screw Top Glass Vials, 4.0 mL
• 14 Stoppers

• 18 Weigh Boats
• Gilson M-25 Microman Positive Displacement Pipettor
• Eppendorf™ Repeater® Pipettor and five Combitips® (3 x 12.5 mL, 1 x 5.0 mL, and 1 x 50 mL)
• Balance capable of accurately weighing 5 grams
• Differential Photometer or RPA-I Photometer
• Indelible marker for labeling test tubes
• Watch or timer
• Clean running water or a wash bottle containing tap or deionized water (500 mL)
• Calculator (optional)

Suggestions for Pipettor Use

• Practice using both pipettors (positive displacement and Repeater pipettor) with water and extra tips before you analyze your samples.
• Use a new tip each time you use the Repeater pipettor to avoid reagent cross-contamination. Label three 12.5 mL tips "Diluent", "Substrate" and "Stop," and one 5.0 mL tip "Conjugate".
• Draw the desired reagent volume into the Repeater pipettor and dispense one portion of the reagent back into the container to properly engage the ratchet mechanism. If you do not do this, the first volume delivered may be inaccurate.
• To add reagents using the Repeater pipettor, pipette down the side of the test tube just below the rim.
• To add samples and calibrators using the positive displacement pipettor, pipette down the side of the test tube just above the liquid level.
• The carryover volume of the positive displacement tips is minimal, but may affect results if you are going from a high to low DDT concentration. Use a new pipettor tip each time you pipette a new unknown.

Assay Procedure

Collect/Store the Sample

1. Collect soil in appropriately sized and labeled containers.
2. Take care to remove excess twigs, organic matter and rocks or pebbles from the sample. For best results, wet soils should be air-dried overnight and thoroughly mixed before testing.
3. Store soil samples at 4°C (39°F).

Prepare the Sample/Extract the Soil

1. Please follow the instructions from the EnviroGard Soil Extraction Bottle Kit to prepare the soil extract before the assay.
2. **5 ml** of **Methanol** will be used to extract DDT residue from a 5 gram soil sample. As per instructions, attach a **50 mL** Combitip to the Repeater pipettor and set the dial to **5**. Deliver once to add **5 mL** of **methanol** to the extraction vial, and cap tightly.

Perform the Test

NOTE: Allow all reagents and sample extracts to reach room temperature before you begin the test. Do not analyze more than 20 test tubes at a time.

1. The choice of calibrators to use in the test will depend on the selection of the analyst. The use of two calibrators may be appropriate if screening for a single level of DDT.

Remove the test tubes from the plastic bag and label them as follows*:

Tube Label	Tube Contents
NC	Negative Control
C1	0.2 ppm Calibrator
C2	1.0 ppm Calibrator
C3	10.0 ppm Calibrator
S1	sample 1
S2	sample 2
etc.	

You are not required to perform the assay in duplicate; however, doing so will increase the precision.
Place the test tubes in the test tube rack. Push down on each tube so that it is held firmly and does not fall out of the rack when shaken.
CAUTION: Do not "snap" the test tubes into the rack as this may result in a cracked tube.

2. Attach the **12.5 mL** Combitip labeled "Diluent" to the Repeater pipettor and adjust the dial to **2**. Add 500 microliters (µL) of Assay Diluent to each test tube.
3. Attach a clean pipette tip to the Microman pipettor and adjust the dial to "250". Add 25 µL of each calibrator (including Negative Control) to the corresponding test tube by placing the end of the pipette tip against the side of the tube (just above the level of the Assay Diluent) and dispensing the volume. Use a clean pipette tip each time.

CAUTION: Replace the caps on the calibrator vials immediately after use to minimize evaporation.
4. Using a clean tip for each sample, add 25 µL of each sample extract to the appropriately labeled test tube.
5. Attach the **5.0 mL** Combitip labeled "Conjugate" to the Repeater pipettor and adjust the dial to **1.** Add 100 µL of DDTEnzyme Conjugate to each test tube.
6. Shake the test tube rack to mix for 10 to 15 seconds. Leave the test tubes undisturbed for 15 minutes.
7. Vigorously shake out the test tube contents into a sink or suitable container. Fill the test tubes to **overflowing** with cool tap or distilled water, then decant and vigorously shake out the remaining water.
Repeat this wash step three more times, being certain to shake out as much water as possible on each wash. After the final wash, remove as much water as possible by tapping the inverted tubes on absorbent paper.
8. Attach the **12.5 mL** Combitip labeled "Substrate" to the Repeater pipettor and set the dial to **2**. Add 500 µL of Substrate to each test tube. Leave the test tubes undisturbed for 10 minutes.

NOTE: If a blue color does not develop in the Negative Control test tube within 10 minutes after adding the Substrate, the test is invalid and you must repeat it.

Interpret the Results

You can either interpret the results visually within 10 minutes after adding the Substrate to each test tube, or you can perform a more precise analysis with a photometer after you add the Stop Solution.

Visual Interpretation

After you add the Substrate, wait 10 minutes then mix the test tubes by shaking them for a few seconds until they are a uniform blue color. Compare the sample test tube to the calibrator test tubes against a white background. The test tube rack in the kit is well-suited for this purpose.

NOTE: The word DDT in the interpretation instructions below refers to "total DDT", i.e. the sum of p,p'-DDT, p,p'-DDD, and p,p'-DDE.

• If a sample test tube contains more color than the calibrator test tube, the sample contains DDT at a concentration lower than the calibrator.
• If a sample test tube contains less color than the calibrator test tube, the sample may contain DDT at a concentration greater than the calibrator.
• If the sample test tube contains color that is between the calibrator test tubes, the sample contains DDT at a concentration between the calibrator concentrations.
• If a sample test tube contains approximately the same amount of color as the calibrator test tube, the sample contains DDT at a concentration approximately equal to the calibrator.
• If the sample test tube contains less color than the 10 ppm Calibrator test tube, you may dilute a fraction of the soil extract in methanol (for example, 1:100) and perform the assay again. To determine the

concentration of the diluted extract multiply the result by the dilution factor. (Go to "Semi-Quantitative Interpretation" for further details.)

Photometric Interpretation

After you add the Substrate, wait 10 minutes then add the Stop Solution to each test tube.
WARNING: Stop solution is 1N Hydrochloric acid.

Attach the **12.5 mL** Combitip labeled "Stop" to the Repeater pipettor and set the dial to **2**. Add 500 µL of Stop Solution to each test tube. This converts the blue color in the test tubes to yellow.

NOTE: After you add Stop Solution to the test tubes, results should be read within 30 minutes.

Differential Photometer

1. Place a water blank test tube containing 1.5 mL of deionized water, or equivalent in the left (reference) well.
2. Place the Negative Control test tube into the right (sample) well. Record the optical density (OD) of the Negative Control.
3. Remove the Negative Control test tube and replace it with the 0.2 ppm Calibrator test tube to reactivate the photometer. Record the result. Repeat this step to determine the OD for each of the remaining calibrators and for each sample.

Semi-quantitative Interpretation

Compare the OD of each sample to the OD of each calibrator:
NOTE: The word DDT in the interpretation instructions below refers to "total DDT", i.e. the sum of p,p'-DDT, p,p'-DDD, and p,p'-DDE.
• If a sample OD is equal to the OD of a calibrator, the sample contains DDT at a concentration approximately equal to the calibrator.
• If a sample OD is greater than a calibrator OD, the sample contains less DDT than the calibrator.
• If a sample OD is lower than a calibrator OD, the sample may contain more DDT than that calibrator.
• If an assay result indicates that a soil sample contains greater than 10 ppm total DDT, but you need more specific information, the soil extract may be diluted 1:100 in neat methanol, and assayed again. You must then multiply the results of the re-assay by 100 to determine the approximate sample concentration.

NOTE: If you know in advance that the "action level" of interest is greater than 10 ppm total DDT in soil, the assay may be modified to pinpoint that particular concentration. For example:

If you wish to categorize samples as less than or greater than 250 ppm, you should dilute all sample extracts 1:250 in neat methanol (e.g. 20 µL extract plus 4.98 mL methanol) and compare the diluted extracts to the 1 ppm DDT kit calibrator. Due to the 250-fold dilution, the 1 ppm calibrator represents 250 ppm in the assay.

NOTE: If you are interested in action levels greater than 1000 ppm, please contact Technical Assistance for assistance.

Limitations of the Procedure

The EnviroGard DDT in Soil Test Kit is a qualitative/semi-quantitative screening test only. Actual quantitation of DDT by EnviroGard immunoassay is not possible due to the Test kit's cross-reactivity with DDT breakdown products and other similar compounds and to the variations in extraction efficiency inherent in the fast extraction protocol described in this product insert.

Soil sampling error may significantly affect testing reliability. The distribution of pesticides in different soils can be extremely heterogeneous. Soils should be dried and homogenized before analysis by any method. Split samples (i.e. for GC and immunoassay) should always derive from the same homogenate.

Ordering Information

Description	Catalog Number
EnviroGard DDT in Soil Test Kit	73100
EnviroGard Soil Extraction Bottle Kit	72010

Technical Assistance

Strategic Diagnostics Inc.
111 Pencader Drive
Newark, Delaware 19702-3322 USA
800-544-8881
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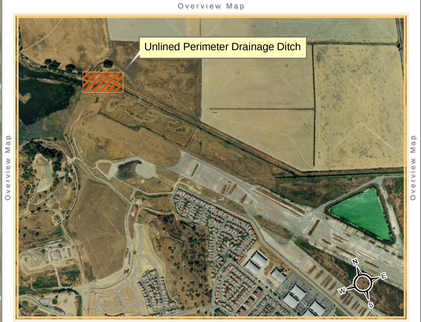
General Limited Warranty

Strategic Diagnostics Inc. warrants the products manufactured by it against defects in materials and workmanship when used in accordance with the applicable instructions for a period not to extend beyond a product's printed expiration date. **SDI MAKES NO OTHER WARRANTY, EXPRESSED OR IMPLIED. THERE IS NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.**

3099050 Rev 3 FEB 98

HAAF-UPDD-CSN-1241
HAAF-UPDD-CSB-1234
HAAF-UPDD-CSN-1230
HAAF-UPDD-CSB-1239
HAAF-UPDD-CSN-1237
HAAF-UPDD-CSS-1245
HAAF-UPDD-CSS-1204
HAAF-UPDD-CSB-1232
HAAF-UPDD-CSS-1224
HAAF-UPDD-CSS-1214
HAAF-UPDD-CSB-1212
HAAF-UPDD-CSN-1215

Overview Map



Overview Map

Total Excavation Volume = 536 cubic yards
Total Excavation Area = 10,719 sq. ft.

Legend

UPDD Excavation Recommendations

Analytical Results Vertical Extent Known	*Recommendation*
< 1 mg/Kg at 0 feet	Do Not Dig
< 1 mg/Kg at 0.5 feet	Dig to 0.5 feet
< 1 mg/Kg at 1.5 feet	Dig to 1.5 feet
< 1 mg/Kg at 2.0 feet	Dig to 2.0 feet

Excavation Areas >= 10 mg/Kg (Field Test Results, see note)

- @ Surface >= 10 mg/Kg
- @ 1.5 feet >= 10 mg/Kg

Other Data Layers

- Elevation Contours (feet)
- Channel Centerline
- Top of Bank Inflection
- Road Shoulder Inflection
- Dirt Road Centerline
- Confirmation Surface Soil Sample
- Confirmation Bottom Soil Sample

See section 3.5 of field sampling plan for explanation of sample identification numbers.

Feet
0 5 10 20 30 40 50
Scale 1:300 1" = 25 feet

US Army Corps of Engineers
Sacramento District
1325 J Street
Sacramento, CA 94805

Date: Aug 11, 2004

Prepared by: Michael O'Neill

N W E S

NAD27 CA State Plane Zone III

Notes:
About the Patterns: The patterns used on this map indicate areas where field tests registered results greater than or equal to 10 mg/Kg. The simple presence of any pattern indicates that concentration was found at some depth below grade. The type of pattern represents the depth at which that concentration was found. The lack of any pattern indicates that no field test results measured greater than 10 mg/Kg.

California

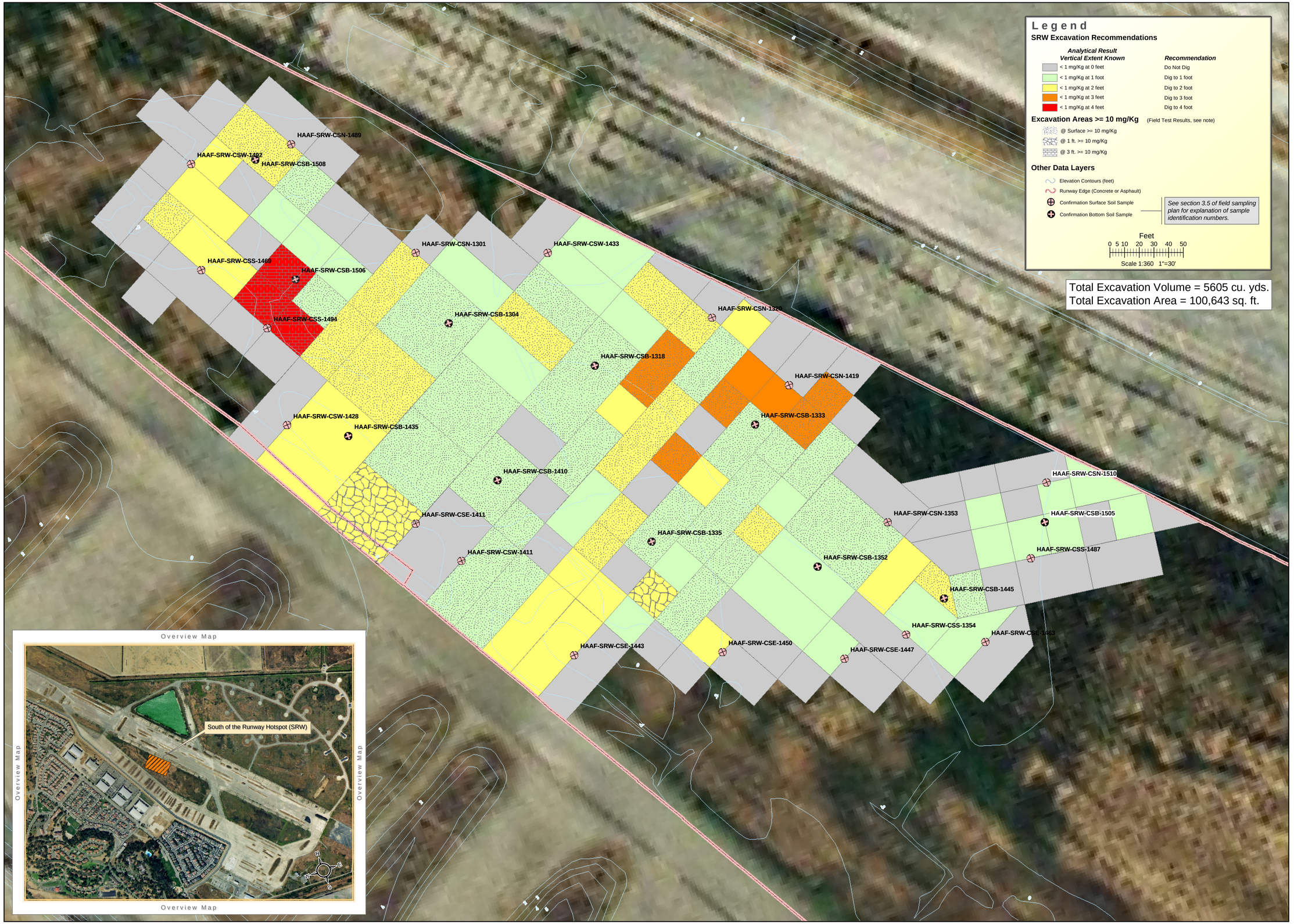
Hamilton Army Airfield

BRAC Remediation Project
Unlined Perimeter Drainage Ditch (UPDD)
Confirmation Sample Locations
Field Effort January, February, June 2004

Novato

Sheet Reference Number:

Figure 1



Legend

SRW Excavation Recommendations

Analytical Result Vertical Extent Known	*Recommendation*
< 1 mg/Kg at 0 feet	Do Not Dig
< 1 mg/Kg at 1 foot	Dig to 1 foot
< 1 mg/Kg at 2 feet	Dig to 2 foot
< 1 mg/Kg at 3 feet	Dig to 3 foot
< 1 mg/Kg at 4 feet	Dig to 4 foot

Excavation Areas >= 10 mg/Kg (Field Test Results, see note)

- @ Surface >= 10 mg/Kg
- @ 1 ft. >= 10 mg/Kg
- @ 3 ft. >= 10 mg/Kg

Other Data Layers

- Elevation Contours (feet)
- Runway Edge (Concrete or Asphault)
- Confirmation Surface Soil Sample
- Confirmation Bottom Soil Sample

See section 3.5 of field sampling plan for explanation of sample identification numbers.

Feet
0 5 10 20 30 40 50
Scale 1:360 1"=30'

Total Excavation Volume = 5605 cu. yds.
Total Excavation Area = 100,643 sq. ft.

Overview Map

Overview Map
Overview Map
Overview Map

US Army Corps of Engineers
Sacramento District
1325 J Street
Sacramento, CA 94805

Date: Aug 9, 2004

Prepared by: Michael O'Neill

N
W E
S

NAD27 CA State Plane Zone III

Notes:
About the Patterns: The patterns used on this map indicate areas where field tests registered results greater than or equal to 10 mg/Kg. The simple presence of any pattern indicates that concentration was found at some depth below grade. The type of pattern represents the depth at which that concentration was found. The lack of any pattern indicates that no field test results measured greater than 10 mg/Kg.

California

Hamilton Army Airfield

BRAC Remediation Project
South of the Runway
Confirmation Sample Locations
Field Effort January, February, June 2004

Novato

Sheet Reference Number:

Figure 2